

2008 MINNESOTA FIRE WEATHER OPERATING PLAN

NWS Offices

Signed by Dan Luna, MIC NWS Chanhassen, MN

Chanhassen, Duluth, MN
Grand Forks, ND
Sioux Falls, Aberdeen, SD
La Crosse, WI

Land Management Agencies

Signed by Ron Stoffel, MN DNR and MNICS Task Force Chairman

Minnesota Department of Natural Resources MN DNR
USDA Forest Service - Region 9 (Superior and Chippewa National Forests)
DOI US Fish and Wildlife Service
DOI National Park Service
DOI Bureau of Indian Affairs.



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FIRE WEATHER OPERATING PLAN FOR MINNESOTA NATIONAL WEATHER SERVICE - FEBRUARY, 2008



INTRODUCTION

This document serves as the Minnesota Fire Weather Operating Plan (AOP) for the National Weather Service (NWS) and the interagency fire management community with fire management responsibility in Minnesota. The relationship between the NWS and land management agencies is established in the following documents:

- Interagency Agreement for Meteorological Services (National Agreement). See Appendix G.
- NWS Directive NWSI 10-4; Fire Weather <http://www.weather.gov/directives>
- Eastern Area Mobilization Guide

This AOP provides specific policy and procedure information used to provide forecast service to the fire management community in the State of Minnesota. In support of the Eastern Area Coordination Center, the EACC meteorologist will act as a liaison between the interagency fire management community and the NWS.

This Operating Plan is updated annually, and is reviewed by representatives of the NWS and each user agency prior to the onset of the spring fire season. All parties should have a copy of this plan available for reference purposes. Each fire management agency receiving this plan will be responsible for duplicating and distributing this plan to field offices which require NWS forecasts. The Operating Plan is also available in the Fire Weather section of NWS web sites.

(1)

SUMMARY OF CHANGES FOR 2008

- 1) At the request of Land Managers, NWS offices will attempt to issue the afternoon Fire Weather Planning Forecast by 1500. The NFDRS point forecast issuance remains at 1530.
- 2) Per local policy, NWS offices may broadcast Red Flag Warnings and Fire Weather Watches affecting their area of forecast responsibility on NOAA Weather Radio.
- 3) The Duluth NWS office will host a Fire Weather Internet Briefing Page which can be linked on their office web page. <http://weather.gov/dlh/firewx.php>.
- 4) More detailed instructions on establishing fire weather observations sites are included in Section III. C.
- 5) Upon release from an Incident, NWS offices will follow the Memorandum of Understanding between the NWS and NWS Employees Organization regarding rest periods for IMETs following a deployment. See Part B – Special Services.
- 6) Point forecasts will be issued through fire season for Baudette and Detroit Lakes.

I. SERVICE AREA AND ORGANIZATIONAL DIRECTORY

A. NWS OFFICES SERVING MINNESOTA, POINTS OF CONTACT, AND BACKUP

The following NWS offices provide fire weather forecast service to the State of Minnesota: Duluth, Twin Cities/Chanhassen, Grand Forks, Aberdeen, Sioux Falls, La Crosse. See page 5 for a map of NWS forecast areas in Minnesota.

TWIN CITIES/CHANHASSEN NWS Forecast Office

1733 Lake Drive West

Chanhassen, MN 55317-8581

Operations Phone 952-361-6671 Administrative Phone 952-361-6670 FAX 962-361-6668

Web Address <http://weather.gov/mpx>

Backup office: NWS Duluth

Byron Paulson Fire Weather Focal Point/IMET byron.paulson@noaa.gov

Todd Krause Assistant F/W Focal Point todd.krause@noaa.gov

Dan Luna Meteorologist-in-Charge Daniel.luna@noaa.gov

DULUTH NWS Forecast Office

5027 Miller Trunk Highway

Duluth, MN 55811-1442

Operations Phone 218-729-6572 Administrative 218-729-0651 x642 FAX 218-729-0690

Web Address <http://weather.gov/dlh>

Backup office: NWS Twin Cities/Chanhassen

Roman Berdes Fire Weather Focal Point roman.berdes@noaa.gov

Michael Stewart Meteorologist-in-Charge michael.stewart@noaa.gov

GRAND FORKS NWS Forecast Office

4797 Technology Circle

Grand Forks, ND 58203-0600

Operations Phone 701-795-5119 Administrative 701-795-5198 FAX 701-772-0751

Web Address <http://weather.gov/fgf>

Backup office Bismark, ND 701-250-4452

Al Voelker Fire Weather Focal Point al.voelker@noaa.gov

Mark Frazier Meteorologist-in-Charge mark.frazier@noaa.gov

LA CROSSE NWS Forecast Office

N2788 County Road

La Crosse, WI 54601-3038

Operations Phone 608-784-8292 Administrative 608-784-8275 x642 FAX 608-784-8238

Web Address <http://weather.gov/arx>

Backup Office Des Moines, IA 515-270-4501

Dave Schmidt Fire Weather Focal Point

dave.schmidt@noaa.gov

Rod Swerman Assistant F/W Focal Point

rod.swerman@noaa.gov

Glenn Lussky Meteorologist-in-Charge

glenn.lussky@noaa.gov

SIOUX FALLS NWS Forecast Office

26 Weather Lane

Sioux Falls, SD 57104-0198

Operations Phone 605-330-4246 Administrative 605-330-4247 FAX 605-330-4248

Web Address <http://weather.gov/fsd>

Backup Office Aberdeen, SD

Mike Fuhs Fire Weather Focal Point

michael.fuhs@noaa.gov

Jeff Chapman Assistant F/W Focal Point

jeffery.chapman@noaa.gov

Greg Harmon Meteorologist-in-Charge

greg.harmon@noaa.gov

ABERDEEN NWS Forecast Office

824 Brown County 14 South

Aberdeen, SD 57401

Operations Phone 605-225-5547 Administrative 605-225-0519 FAX 225-7417

Web Address <http://weather.gov/abr>

Backup Office Sioux Falls, SD

Stanley Keefe Fire Weather Program Leader

stanley.keefe@noaa.gov

Travis Tarver Assistant F/W Program Leader

travis.tarver@noaa.gov

James Scarlett Meteorologist-in-Charge

james.scarlett@noaa.gov

OTHER IMPORTANT NWS CONTACTS

Larry Van Bussum, Natl F/W Ops Coord (NFWOC) Phone 208-334-9824, or 9862

National Interagency Fire Center (NIFC) FAX 208-334-1660

3833 South Development Avenue, Bldg 3807

Boise, ID 83705-5354

e-mail larry.vanbussum@noaa.gov

(3)

Gary Schmeling

Phone

Regional Operational Services Meteorologist (ROSM) 816-891-7734, x704
National Weather Service, FAX 816-891-7810
Central Region Headquarters
7220 NW 101st Terrace
Kansas City, MO 64153
email gary.schmeling@noaa.gov
Central Region web site <http://weather.gov/crh>

Heath Hockenberry Phone 208-334-9824
National Fire Weather Program Leader
National Weather Service
3833 South Development Ave.
Boise, ID 83705
email heath.hockenberry@noaa.gov

National Fire Weather web page <http://fire.boi.noaa.gov>

B. PARTICIPATING AGENCIES

1. DOC/NOAA - National Weather Service (offices listed in part I.A above.)
2. USDA Forest Service - Region 9 (Superior National Forest, Chippewa National Forest)
3. DOI National Park Service
4. DOI US Fish and Wildlife Service
5. DOI Bureau of Indian Affairs.
6. Minnesota Department of Natural Resources MNDNR

See Appendix A for a full listing of agency contacts, addresses, and phone numbers.

II. SERVICES PROVIDED BY THE NATIONAL WEATHER SERVICE

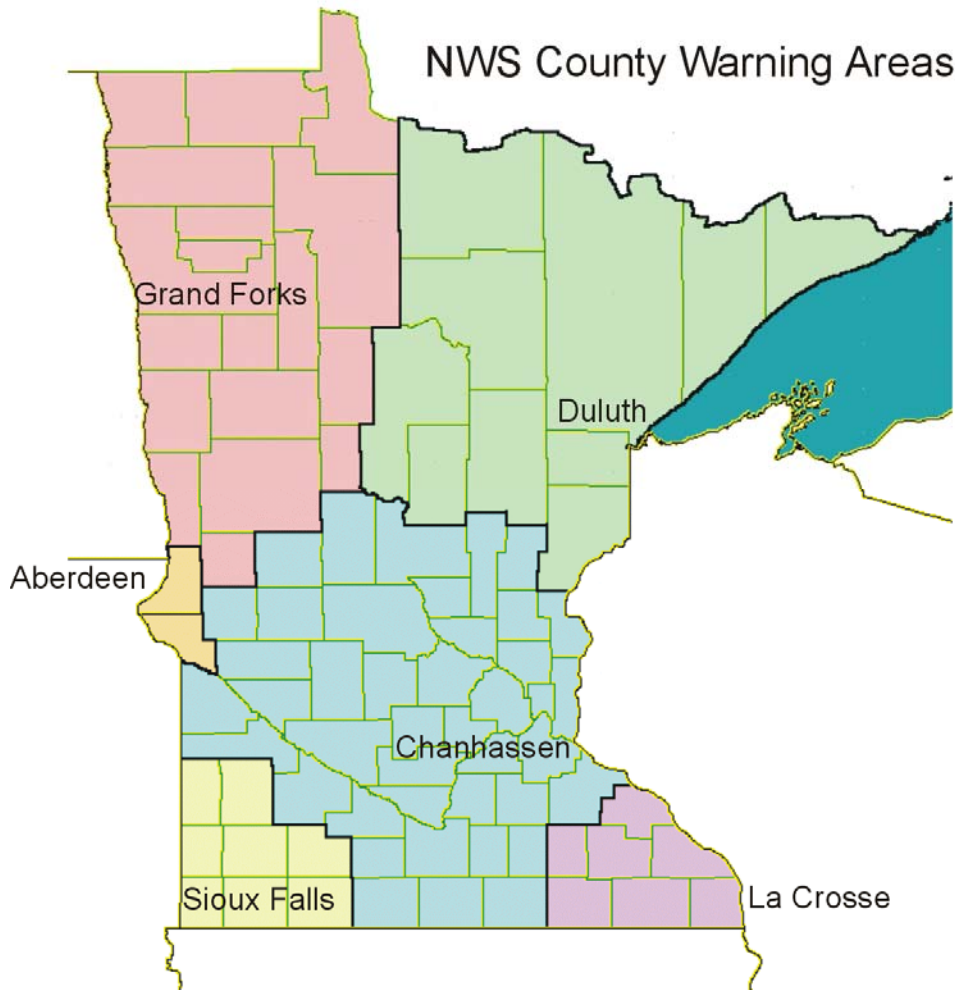
A. BASIC SERVICES - This section describes the fire weather products and services provided by the NWS as described in National Weather Service Directive NWSI 10-401. Significant changes to the services provided in Minnesota are generally coordinated at the annual Minnesota State Fire Weather Meeting. Since there are no full-time forecasters devoted solely to fire weather, these duties are scheduled among other warning and forecast responsibilities. However, spot forecasts for wildfires are treated with a high priority.

1. ROUTINE FIRE WEATHER FORECASTS

- a) **Issuance** - Forecasts usually begin in early April in southern Minnesota, but have begun as early as mid March. Forecasts are initiated farther north as the snow melts. User agencies are responsible for requesting NWS offices serving their area to begin forecast service. See Figure 1 for the NWS offices and their areas of forecast responsibility. Fire season generally ends across Minnesota in November, but has been extended as late as mid December. User agencies will coordinate with the appropriate NWS office to determine when forecasts are no longer needed in their areas.

(4)

Figure 1 County Warning Areas (CWA) for NWS offices serving Minnesota.



During fire season, Fire Weather Planning Forecasts are issued twice daily - once by 0700 with the afternoon issuance by 1500, if possible. Forecasts are updated if a Fire Weather Watch or Red Flag Warning is issued or cancelled, or the current forecast does not adequately describe expected weather conditions. If forecasts are updated, a call must be made to MIFC Dispatch (218-327-4558) or Doug Miedtke, MN DNR (218-327-4445). Over about the southern half of the state, (See figure 2) forecasts are discontinued on June 1st, unless customers request that they continue or resume again at a later date. Point forecasts are issued for a number of NFDRS sites by 1530. Spot forecasts are issued upon request.

b) Access to Forecasts - Forecasts are transmitted through the NWS AWIPS computer system. They are then available to customers via WIMS, NWS office web sites, or on sites maintained by Predictive Services web sites at the GACCs. NWS web sites are listed in part I.A. General weather forecasts, hourly weather conditions, weather warnings, climate data and other weather information are available via continuous broadcast on NOAA weather Radio network broadcast by the NWS. NWS offices may also choose to broadcast Red Flag Warnings on NOAA Weather Radio. See Appendix F.

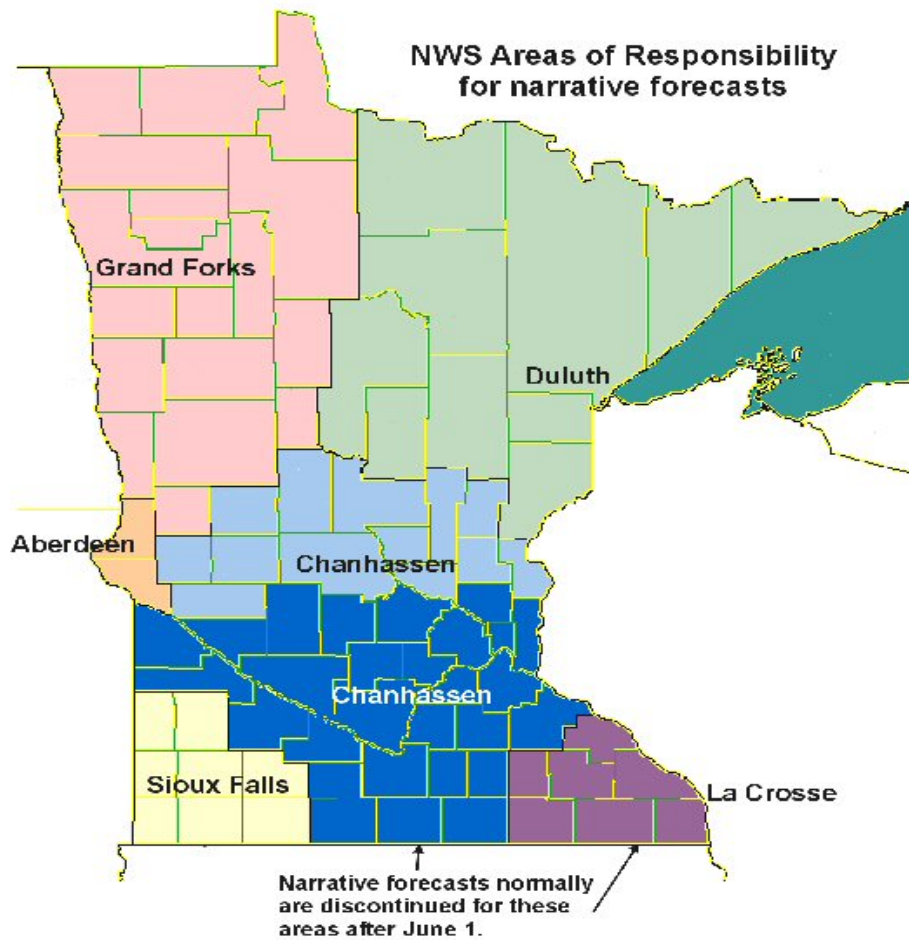


Figure 2. Narrative forecasts for much of southern Minnesota will normally be discontinued by NWS Twin Cities/Chanhasen and NWS La Crosse on June 1 as depicted.

1) Fire Weather Planning Forecasts are issued for 98 fire weather zones. These zones, shown in Figure 3 generally follow county lines. Some of the larger counties may be subdivided into smaller zones. Appendix E has a list of zone numbers, county and key city names, as well as weather reporting stations.

Morning narrative forecasts are written for three forecast periods (TODAY, TONIGHT, TOMORROW). Afternoon narrative forecasts are written for (TONIGHT, TOMORROW, TOMORROW NIGHT, NEXT DAY). A forecast for days 3 through 7 is appended to each forecast group. A wind forecast is included through day 7.

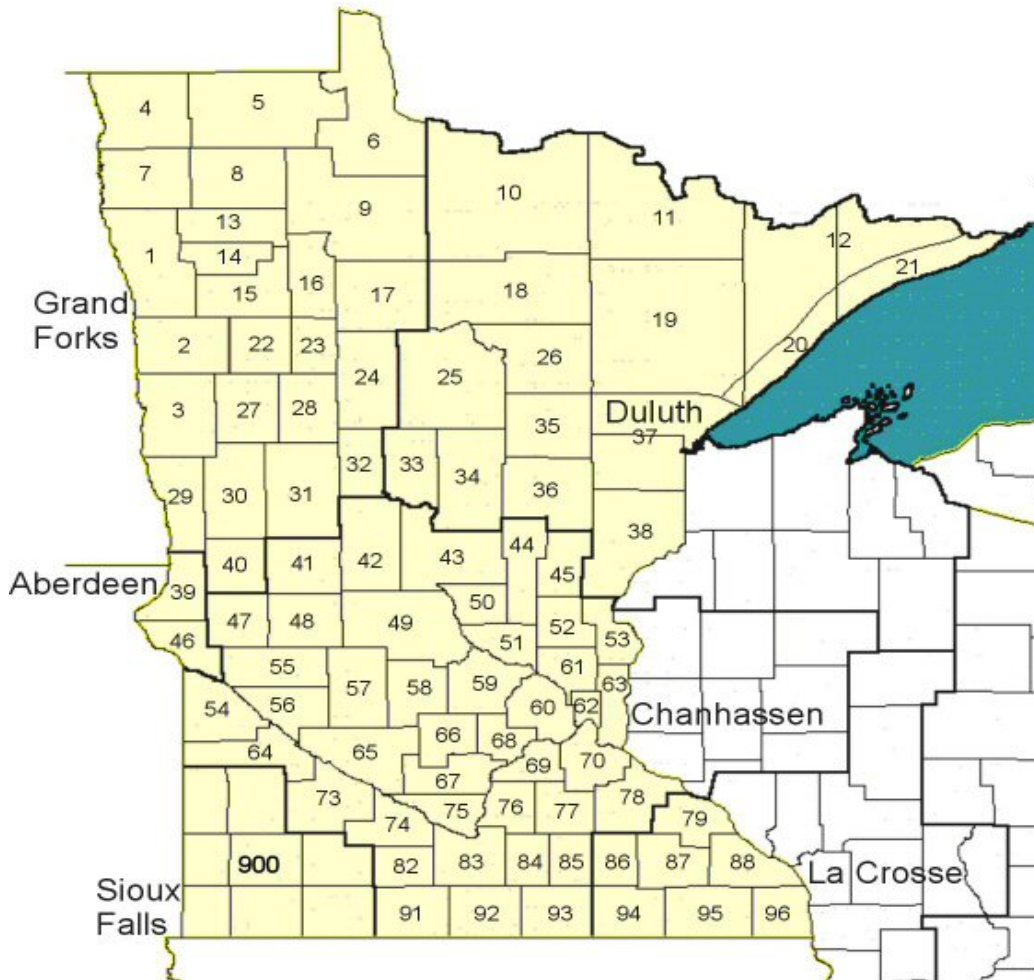


Figure 3. Forecast zone structure for NWS fire weather narrative products. Some zones are subdivisions of larger counties. Thick, black lines show the boundaries or the County Warning Areas (CWA) or each NWS office.

The elements in the narrative forecast are:

Headline (Required for Red Flag Warnings and Fire Weather Watches)

- encouraged to add headlines for other significant weather concerns or changes.

Discussion

- written with enough detail to give users knowledge of weather causes during the forecast period.
- provides frontal positions, movements and timing..
- serves as a vehicle to discuss reasoning for headlines or expected changes in critical parameters such as temperature, humidity, and wind

Sky/Weather

- sky and general weather conditions including trends
- as specific as possible on timing, duration and coverage of precipitation
- as specific as possible on cloud coverage, type, and trends

High and low temperature

- temperature ranges kept as small as possible, 5 degrees or less

Relative humidity

- forecast daytime minimum and nighttime maximum
- humidity ranges of 5 percent when RH is 40 percent or less;
- a maximum range of 10% can be used for RH greater than 40 percent

20 ft. wind speed (mph) and direction

- as specific as possible on timing of significant speed and directional changes
- given in ranges of 5 mph or less and includes gusts
- forecast direction to nearest 8 cardinal compass points (northwest, north, southeast)

Other elements included:

Haines Index

- determined for the 850 - 700 MB level (about 5,000 ft to 10,000 ft.)
- attached to "TODAY" and "NEXT DAY" on the morning narrative
- attached to the "TOMORROW" period on the afternoon forecast
- provided throughout the fire season when narrative forecast available.

Smoke Management parameters

- depth of mixing layer (feet). The average mixing height from 12 to 18 hours local time.
- attached to "TODAY" and "NEXT DAY" on the morning narrative
- attached to the "TOMORROW" period on the afternoon forecast
- transport winds (speed (mph) and direction) in the mixing layer
- dispersion index consisting of a number and a text ranking of poor, fair, good, or excellent (Appendix C explains the terms used in smoke management)
- provided throughout the fire season when narrative forecast available.

Hours of sunshine

- important for assessing probability of ignition of fine fuels (strong insolation can make them more likely to ignite)

Precipitation amount

- average areal amount.

Extended forecasts

- added after each forecast group providing forecasts for the 3-7 day period.
- included are: sky/weather, temperature, with a wind forecast thru Day 7.

**Optional elements in narrative forecasts may vary slightly between NWS offices

FIRE WEATHER PLANNING FORECAST FOR CENTRAL AND MOST OF SOUTHERN MN AND WC WISCONSIN NATIONAL
WEATHER SERVICE CHANHASSEN/TWIN CITIES MN
700 AM CDT WED MAY 7 2008

.DISCUSSION...AT DAYBREAK A COLD FRONT WAS MOVING INTO THE WESTERN DAKOTAS. WARMER AIR WILL PUSH INTO MINNESOTA AND WISCONSIN AHEAD OF THE FRONT. EXPECT SOUTHERLY SURFACE WINDS TO INCREASE AS THE FRONT APPROACHES. THESE WINDS WILL IMPORT MORE HUMID AIR INTO THE REGION. BY SUNSET THE FRONT WILL PUSH ACROSS THE WESTERN BORDER OF MINNESOTA ARRIVING IN EASTERN MINNESOTA EARLY THURSDAY MORNING. SCATTERED SHOWERS AND THUNDERSTORMS WILL ACCOMPANY THE FRONT. HIGH PRESSURE WILL THEN BUILD INTO THE AREA FOR THE NEXT SEVERAL DAYS BRINGING COOLER AND DRIER WEATHER.

MN039-041-046>048-054>056-064-072130-
TRAVERSE-DOUGLAS-BIG STONE-STEVENS-POPE-SWIFT-LAC QUI PARLE-CHIPPEWA-YELLOW MEDICINE-
INCLUDING THE CITIES OF ALEXANDRIA...MONTEVIDEO
700 AM CDT WED MAY 7 2008

.TODAY...
SKY/WEATHER.....SUNNY AND WARM.
MAX TEMPERATURE.....80 TO 85.
MIN HUMIDITY.....35 TO 40 PERCENT.
20-FOOT WINDS.....SOUTHWEST 10 MPH INCREASING TO 15 MPH BY NOON.
HAINES INDEX.....4 OR LOW.
HOURS OF SUN.....7 TO 9 HOURS.
PRECIPITATION.....NONE.
MIXING HEIGHT.....AROUND 5000 FT AGL (AVE 12-6 PM).
TRANSPORT WINDS.....SOUTHWEST 10 MPH (AVE 12-6 PM).
SMOKE DISPERSAL.....AROUND 50000 OR GOOD (AVE 12-6 PM).

.TONIGHT...
SKY/WEATHER.....MOSTLY CLOUDY. A 40 PERCENT CHANCE OF EVENING THUNDERSTORMS.
MIN TEMPERATURE.....55 TO 60.
MAX HUMIDITY.....85 TO 95 PERCENT.
20-FOOT WINDS.....SOUTHWEST 10 TO 15 MPH BECOMING WEST AFTER MIDNIGHT.
PRECIPITATION.....SCATTERED 0.10 TO 0.20 INCH AMOUNTS.

.THURSDAY...
SKY/WEATHER.....PARTLY CLOUDY...BREEZY AND COOLER. A BRIEF AFTERNOON SHOWER
POSSIBLE. PRECIPITATION CHANCE IS 20 PERCENT.
MAX TEMPERATURE.....73 TO 77.
MIN HUMIDITY.....35 TO 40 PERCENT.
20-FOOT WINDS.....NORTHWEST 10 TO 15 MPH INCREASING LATE MORNING TO 15 TO 20 MPH.
HAINES INDEX.....4 OR LOW.
HOURS OF SUN.....7 TO 9 HOURS.
PRECIPITATION.....ISOLATED 0.02 TO 0.05 INCH AMOUNTS.
MIXING HEIGHT.....AROUND 4000 FT AGL (AVE 12-6 PM).
TRANSPORT WINDS.....SOUTHWEST 20 MPH (AVE 12-6 PM).
SMOKE DISPERSAL.....AROUND 80000 OR EXCELLENT (AVE 12- PM).

.FORECAST DAYS 3 THROUGH 7...
.THURSDAY NIGHT...PARTLY CLOUDY. LOWS IN THE UPPER 40S. WIND NORTHWEST 10 MPH.
.FRIDAY...PARTLY CLOUDY. HIGHS IN THE LOWER 70S. WIND NORTHWEST 10 TO 15 MPH.
.FRIDAY NIGHT...PARTLY CLOUDY. LOWS IN THE LOWER 50S. WIND WEST 5 TO 10 MPH.
.SATURDAY...MOSTLY SUNNY. HIGHS IN THE MID 70S. WIND WEST 15 MPH.
.SATURDAY NIGHT...MOSTLY CLEAR. LOWS IN THE LOWER 50S. WIND SOUTHWEST 5 TO 10 MPH.
.SUNDAY....PARTLY CLOUDY. WARMER. HIGHS IN THE UPPER 70S. SOUTHWEST WINDS 15 MPH.
.SUNDAY NIGHT...A CHANCE OF SHOWERS. LOWS IN THE UPPER 50S. WIND SOUTHWEST 10 MPH. CHANCE OF RAIN 30 PERCENT.
.MONDAY...A CHANCE OF THUNDERSTORMS. HIGHS AROUND 80. WIND SOUTHWEST 15 TO 20 MPH. CHANCE OF RAIN 40 PERCENT.
.MONDAY NIGHT...PARTLY CLOUDY. COOLER. LOWS IN THE LOWER 50S. WIND NORTHWEST 10 MPH.
.TUESDAY...PARTLY CLOUDY. HIGHS IN THE LOWER 70S. WIND NORTHWEST 15 TO 20 MPH.
\$\$

OTHER ZONE GROUPINGS TO FOLLOW

Figure 4. Example of a morning narrative forecast for part of central Minnesota

FIRE WEATHER PLANNING FORECAST FOR E NORTH DAKOTA AND NW AND WC MINNESOTA
 NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS ND
 300 PM CDT SAT JUN 7 2008

.DISCUSSION...GUSTY NORTHWEST WINDS AND COOLER TEMPERATURES WILL FOLLOW A COLD FRONT WHICH MOVED OUT OF THE AREA EARLIER TODAY. HIGH PRESSURE WILL PUSH INTO WESTERN MINNESOTA LATE SUNDAY BRINGING LESS WIND BUT CONTINUED COOL TEMPERATURES. A WARMING TREND WILL BEGIN ON TUESDAY AHEAD OF AN APPROACHING TROUGH OF LOW PRESSURE. THE APPROACH OF THE TROUGH WILL BRING A CHANCE OF SHOWERS BY THURSDAY NIGHT.

MN001>009-013>016-081200-
 W POLK-NORMAN-CLAY-KITSON-ROSEAU-LAKE OF THE WOODS-W MARSHALL-E MARSHALL-N
 BELTRAMI-PENNINGTON-RED LAKE-E POLK-N CLEARWATER-
 INCLUDING THE CITIES OF ROSEAU...THIEF RIVER FALLS
 300 PM CDT SAT JUN 7 2008

.TONIGHT...
 SKY/WEATHER.....PARTLY CLOUDY AND COOL. BREEZY.
 MIN TEMPERATURE.....45 TO 50.
 MAX HUMIDITY.....90 TO 95 PERCENT.
 20-FOOT WIND.....NORTHWEST 15 TO 20 MPH DIMINISHING TO 10 TO 15 MPH AFTER SUNSET.
 PRECIPITATION.....NONE.

.SUNDAY...
 SKY/WEATHER.....PARTLY CLOUDY...WINDY AND COOLER.
 MAX TEMPERATURE.....60 TO 65.
 MIN HUMIDITY.....35 TO 40 PERCENT.
 20-FOOT WIND.....NORTHWEST 20 TO 25 MPH DECREASING TO 10 TO 15 MPH TOWARD SUNSET.
 HAINES INDEX.....4 OR LOW.
 HOURS OF SUN.....7 TO 9 HOURS.
 PRECIPITATION.....NONE.
 MIXING HEIGHT..... AROUND 4000 FT AGL (AVE 12-6 PM).
 TRANSPORT WINDS.....NORTHWEST 25 MPH (AVE 12-6 PM).
 SMOKE DISPERSAL.....AROUND 100000 OR EXCELLENT (AVE 12-6 PM).

.SUNDAY NIGHT...
 SKY/WEATHER.....PARTLY CLOUDY.
 MIN TEMPERATURE.....40 TO 45.
 MAXIMUM HUMIDITY.....90 TO 95 PERCENT.
 20-FOOT WIND.....NORTHWEST 10 TO 15 MPH.
 PRECIPITATION.....NONE.

.MONDAY...
 SKY/WEATHER.....SUNNY.
 MAX TEMPERATURE.....62 TO 66.
 MIN HUMIDITY.....35 TO 40 PERCENT.
 20-FOOT WIND.....NORTHWEST 10 TO 15 MPH.
 HAINES INDEX.....4 OR LOW.
 HOURS OF SUN.....7 TO 9 HOURS.
 PRECIPITATION.....NONE.
 MIXING HEIGHT.....AROUND 5000 FT AGL (AVE NOON-6 PM).
 TRANSPORT WINDS.....SOUTHWEST 10 MPH. (AVE NOON-6 PM).
 SMOKE DISPERSAL.....AROUND 50000 ...GOOD (AVE NOON-6 PM).

.FORECAST DAYS 3 THROUGH 7...
 .MONDAY NIGHT...MOSTLY CLEAR. LOWS IN THE LOWER 50S. WIND NORTHWEST 5 TO 10 MPH.
 .TUESDAY...SUNNY. HIGHS AROUND 70. WIND NORTHWEST 10 TO 15 MPH.
 .TUESDAY NIGHT...CLEAR. LOWS IN THE LOWER 50S. WIND WEST 5 MPH.
 .WEDNESDAY...SUNNY. HIGHS IN THE LOWER 70S. WIND SOUTHWEST 10 MPH.
 .WEDNESDAY NIGHT...PARTLY CLOUDY. LOWS IN THE MID 50S. WIND SOUTHWEST 10 MPH.
 .THURSDAY...PARTLY CLOUDY. HIGHS IN THE MID 70S. WIND SOUTHWEST 10 TO 15 MPH.
 .THURSDAY NIGHT... CHANCE OF SHOWERS. LOWS MID 50S. WIND SOUTHWEST 10 MPH. CHANCE OF RAIN 30 PERCENT.
 .FRIDAY...A CHANCE OF THUNDERSTORMS. HIGHS IN THE MID 70S. WIND SOUTHWEST 15 TO 20 MPH. CHANCE OF RAIN 40 PERCENT.
 .FRIDAY NIGHT...A CHANCE OF THUNDERSTORMS. LOWS IN THE MID 50S. WIND SOUTHWEST 10 MPH. CHANCE OF RAIN 40 PERCENT.
 .SATURDAY...A CHANCE OF SHOWERS. HIGHS IN THE LOWER 70S. WIND WEST 10 TO 15 MPH. CHANCE OF RAIN 30 PERCENT.
 \$\$

OTHER ZONE GROUPINGS TO FOLLOW

Figure 5. Example of an afternoon narrative forecast, for a portion of northwest Minnesota.

2. Point Forecasts are issued by 1530 local time for the following NFDRS locations.

<u>Duluth</u>		<u>Grand Forks</u>		<u>Minneapolis</u>	
Cass Lake	211604	Baudette	210301	Sherburne	214001
Ely	210509	Detroit Lakes	212201	Litchfield	214501
Seagull	210709				
Hibbing	210512			<u>Aberdeen</u>	
Moose Lake	211803			Big Stone	213501
Brainerd	212601				
Rice Lake	211703				

The National Fire Danger Rating System (NFDRS) is designed to represent the fire potential at the “worst time of day” over a large area, generally in excess of 100,000 acres. The output from the NFDRS serves to indicate the levels of fire danger. From this, resource allocation and staffing are determined by the land management agencies.

Each afternoon, by 1530 local time, the forecaster will issue point forecasts for stations at which reliable and timely observations are available on that day. During April and May, when necessary, and as forecast duties allow, the forecaster should update the NFDRS point forecasts issued from the previous afternoon if significant changes have occurred. These updates will be available by 0700.

On June 1st, point forecasts will be continued only for Ely, Seagull, Hibbing, Cass Lake, Baudette, and Detroit Lakes. Point forecasts for other stations may be continued past June 1st, or may be resumed again later in the fire season, upon request of land managers. Lightning Activity Level (LAL) is not forecast for any Minnesota NFDRS sites.

NWS offices are encouraged to verify NFDRS forecasts and share results with State and Federal users.

NWS product ID's for each NWS office are:

MSPFWMPX	NWS Minneapolis/Chanhassen
MSPFWMDLH	NWS Duluth
BISFWMFGF	NWS Grand Forks
FSDFWMABR	NWS Aberdeen
	NWS Sioux Falls does not issue point forecasts
	NWS La Crosse does not issue point forecasts for Minnesota stations

The format is: (commas but NO spaces)

FCST,SSCCNN,YYMMDD,VT,W,TT,RH,L1,L2,DD,VV,M,TM,TN,HM,HN,P1,P2,WF

STN # code SSCCNN where SS = State (21 is MN) CC = County NN = station

SSCCNN - 6 digit station number from above

YYMMDD - valid day of fcst - year/month/day. The forecast made on April 10, 2008 for the 11th would be 080411

VT - Valid time. always a 13 for 1300 CST (2pm CDT)

W - State of the weather at 1300 CST tomorrow as shown below

0	= less than 1/8 clouds	4 = fog	7 = snow/sleet
1	= 1/8 to 4/8 opaque clouds	5 = drizzle	8 = showers
2	= 5/8 to 7/8 opaque clouds	6 = rain	9 = thunderstorms
3	= cloudy	<i>(Note: categories 5, 6, or 7 set NFDRS indices to zero)</i>	

TT = temperature for 1300 CST tomorrow

RH = relative humidity for 1300 CST tomorrow

* L1 = lightning activity level (1400 CST today until 2300 CST). Always a "1" in Minnesota

* L2 = lightning activity level (2300 CST today until 2300 CST tomorrow). Always a "1" in Minnesota

DD = wind direction at 1300 CST tomorrow (8 point compass)

VV = 20 ft wind speed in mph at 1300 CST tomorrow

M = 10 hr fuel moisture (input by the users and left blank by the forecaster). Two commas will be noted next to each other

TM = maximum temperature from *1300 CST to 1300 CST*

TN = minimum temperature from 1300 CST to 1300 CST

HM = maximum humidity in percent from 1300 CST to 1300 CST

HN = minimum humidity in percent from *1300 CST to 1300 CST*

P1 = pcpn duration in hours from 1300 CST today till 0500 CST tomorrow

P2 = pcpn duration in hours from 0500 CST tomorrow till 1300 CST tomorrow

WF = Wet Flag. A Y or N. It is used to indicate if fuels will be wet at 1300 CST. All indices will be forced to zero if a Y used.

* For stations at Seagull, Ely, and Cass Lake, precipitation amounts of 0.15" or more from 1300 CST today to 1300 CST tomorrow will turn "Wet Flag" to Yes.

* The L1 and L2 values can range from 1 to 6. The higher the number, the greater the risk of lightning. LALs correspond roughly to categories of thunderstorm density:
1 = none, 2 = isolated, 3 = few, 4 = scattered, 5 = numerous. An LAL of 6 is generally reserved for the west where dry lightning is a problem.

At the request of user agencies in Minnesota, the *LAL forecast will always be set to 1 (none)*.

Figure 6. Point Forecast coding and interpretation.

3. Spot Forecasts

- a) **Criteria** - Spot forecasts are **site specific forecasts** in support of wildfire suppression and natural resource management. Spot forecasts for a wildfire will be treated with a priority similar to that of severe weather warnings. It is the responsibility of the requestor to indicate that the request is for wildfire suppression. At the 2005 Minnesota State Fire Weather Meeting it was agreed that the NWS would attempt to process all Spot Forecast requests within 40 minutes whenever possible.

In accordance with NWS Directive NWSI-401:

NWS offices will provide spot forecasts upon request of any federal, state, tribal, or local official who represents the spot forecast is required to support a wildfire.

For non-wildfire purposes, resources permitting, NWS offices will provide spot forecast service under the following circumstances and conditions:

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

NWS offices **will not** provide spot forecasts to private citizens or commercial entities not acting as an agent of a government agency.

Requestor Identification - The requestor for each spot forecast must provide the following information before a spot forecast can be issued.

- a. Name
- b. Government agency
- c. Address and phone number
- d. Representation as to the reason for the spot forecast, which must be one of the reasons indicated above.

A current on-site weather observation should accompany the forecast request. The requestor should specify how the wind measurement was obtained (20 foot or eye-level). In the case of a wildfire or prolonged prescribed burn, updated observations should be provided during the course of the event. Land management personnel should contact the servicing NWS office for an update if forecast conditions appear unrepresentative of actual weather

conditions. Spot forecasts should be considered one-time requests, and are not routinely monitored nor updated. Spot forecasts may be updated when representative observations are available to the forecaster, he/she deems the current forecast does not adequately represent current or expected weather conditions, and emergency contact information is available to disseminate the update. If an update is made, the forecaster must call the emergency contact number listed on the spot forecast request. Feedback from land management personnel is also encouraged during or after the burn.

Users are asked to read the narrative fire weather forecast before making a spot forecast request. To hold the number of spot forecasts to a manageable level, internal coordination and planning should be done by user agencies making forecast requests.

b) Content and Format - The standard format for wildfire spots includes: headlines (mandatory when Red Flag Warning or Fire Weather Watch in effect), discussion, sky/weather, temperature, relative humidity, and 20 foot wind. Optional elements may also be provided. See example below.

The content of non-wildfire spots should conform to the standard format for wildfire spots, though the content and number of forecast periods may be different, as determined by the requestor. Users should be as specific as possible when making a forecast request.

```

SPOT FORECAST FOR CRAZY LAKE FIRE
ISSUED BY NATIONAL WEATHER SERVICE DULUTH, MN
11 AM CDT SUNDAY MAY 11 2008

IF CONDITIONS BECOME UNREPRESENTATIVE CONTACT THE NWS

...INCREASING WINDS THIS AFTERNOON... (headline required for Red Flag Warnings and Fire Weather Watches and recommended
for every issuance.)

.DISCUSSION...SOUTHWEST WINDS WILL INCREASE AHEAD OF AN APPROACHING COLD FRONT. THE FRONT WILL
REACH THE BURN AREA BETWEEN 4 PM AND 6 PM THIS EVENING. WINDS WILL RAPIDLY BECOME NORTHWEST AND
REMAIN GUSTY UNTIL DARK. AN ISOLATED THUNDERSTORM MAY FORM NEAR THE COLD FRONT.

.REST OF TODAY...
SKY/WEATHER.....MOSTLY SUNNY AND DRY. GUSTY WINDS. AN ISOLATED
                    THUNDERSTORM POSSIBLE BETWEEN 4 AND 7 PM.
TEMPERATURE.....82 TO 86
HUMIDITY.....32 TO 36 PERCENT
20-FOOT WIND.....SOUTHWEST 15 TO 20 MPH WITH GUSTS TO 25 MPH. WINDS
                    BECOMING NORTHWEST AFTER 4 PM.
HAINES INDEX.....5 OR MODERATE

.TONIGHT...
SKY/WEATHER..... MOSTLY CLEAR WITH DECEASING WINDS
MIN TEMPERATURE...55 TO 60
MAX HUMIDITY.....80 TO 85 PERCENT
20-FOOT WIND.....NORTHWEST 10 TO 15 MPH.

.MONDAY...
SKY/WEATHER.....PARTLY CLOUDY. BECOMING BREZZY.
HIGH TEMPERATURE...77 TO 81
MIN HUMIDITY.....34 TO 38 PERCENT
20-FOOT WIND.....NORTHWEST 8 TO 12 MPH INCREASING TO 15 TO 20
MPH AFTER 11 AM.
$$
(Optional elements may be added at request of user)

```

Figure 7. Example of a Standardized Spot Weather Forecast for a wildfire.

c. Procedures - An Internet-based program, NWS Spot, is the national standard for requesting, issuing, and retrieving spot forecasts. This program is available on NWS web sites. Spot forecasts can also be requested by phone or fax if NWS Spot is inoperative or if a discussion is needed with a forecaster. A phone call must accompany a fax request so the forecaster is aware of the request.

The requesting agency should provide information about the location, topography, fuel type(s), size, ignition time, and a contact and telephone number of the responsible land management official. When possible, a representative weather observation should accompany the request. As indicated above in section 3.a, requestor information justifying the spot forecast request must also be provided for the forecast request to be honored.

Feedback to the NWS providing the spot forecast is highly encouraged.

4. Fire Weather Watches and Red Flag Warnings

a) Criteria - NWS offices will issue Fire Weather Watches and Red Flag Warnings when the combination of dry fuels and weather conditions support extreme fire danger and/or fire behavior. Primary user agencies (USFS and MN DNR) are responsible for keeping the NWS aware of fuel conditions which could lead to extreme fire danger. The NWS will coordinate with user agencies prior to issuing Fire Weather Watches and Red Flag Warnings. However, if a Fire Weather Watch is currently in effect, it means that weather and fuels conditions have already been coordinated with land managers. In this case, no further coordination is required, if a Red Flag Warning is subsequently issued for the same time period and area. See call list under 4.c. - Procedures. Any National Forests affected will be specified in the Watch or Warning. During situations of borderline criteria for a Fire Weather Watch or Red Flag Warnings terminology such as SEVERE FIRE WEATHER CONDITIONS MAY OCCUR MONDAY AFTERNOON is encouraged in the synopsis portion of the routine narrative forecast. A Fire Weather Watch/Red Flag Warning checklist is shown in Figure 10.

The issuance of these products is typically a two stage process. A **Fire Weather Watch** is issued when there is a reasonable level of confidence that **ALL THREE** of the following weather conditions could be met within 12 to 72 hours, after consultation with appropriate land managers. A **Red Flag Warning** will be issued immediately, after consultation with land managers, if these conditions are observed or there is a high confidence that they will be met within the next 24 hours. *Land managers could request that a Red Flag Warning be issued with weather criteria not meeting these values if fuels are critically dry.*

1. Sustained one-minute winds at standard 20 foot level are at or above 20 mph. However, in the Red River Valley of northwest Minnesota and in the southwest corner of the state sustained winds must be at or above 25 mph. See the map depicting these areas in Figure 9.
2. Minimum relative humidity at or less than 25 percent.
3. Temperatures at or greater than 75 degrees F.

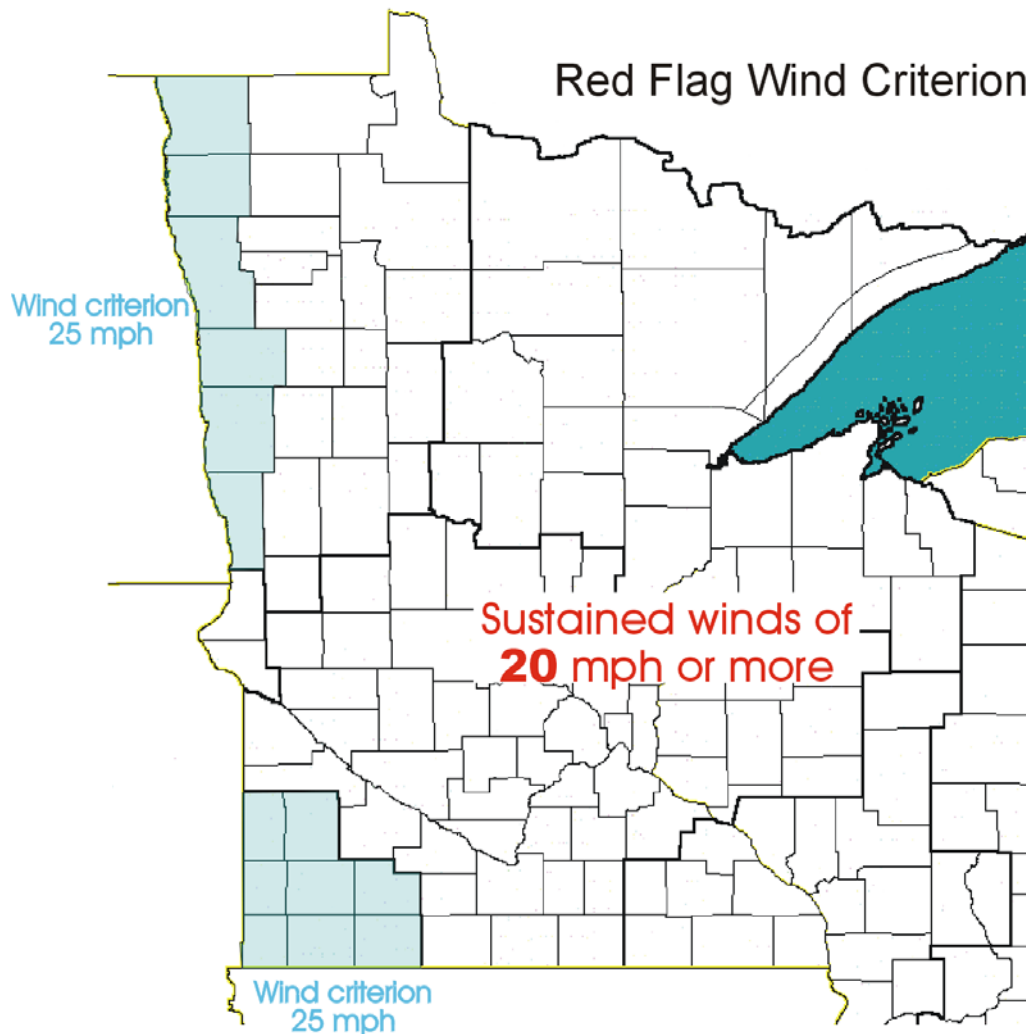


Figure 8. Wind criteria for Fire Weather Watch and Red Flag Warnings. The 2-minute, 33 foot wind threshold is 20 mph over Minnesota except for the Red River Valley in the northwest and the high terrain area in the southwest corner of the state.

Note: Operationally, the wind used in Red Flag criteria is actually a 33 foot wind. A dense network of airport observing sites across Minnesota provides wind reports at least hourly for the forecaster to use in making watch or warning decisions. Research has shown that the reduction from a 33 foot wind to a 20 foot wind is 10% or less for comparably sited instruments.

Other factors which must be considered:

4. Fire Danger Index in the high to extreme category. Source maps for the Fire Danger Rating are on the Minnesota DNR web page at <http://www.dnr.state.mn.us/forestry/fire/>
5. NFDRS output from the NWS product NMCFDICR product which provides information on the Burning Index (BI) and Energy Release Component (ERC). Generally, the BI should be above 4, and the ERC over 40 when a Watch or Warning is issued.

When Red Flag conditions have ended or are no longer expected, the Watch or Warning will be cancelled. This should be coordinated with user agencies.

b) Content/Format

The Watch or Warning headline will specify:

- The valid time, type of event, area affected, and critical weather elements causing the warning to be issued.

The following products will disseminate the Watch or Warning:

- A Fire Weather Watch Message (RFW) will carry the Watch or Warning Headline. The body of the product will describe the weather feature(s) responsible the event and provide detail as to the reason for the event.
- The Fire Weather Planning Forecast (FWF) will include the headline with the DISCUSSION. The headline will also be carried in the appropriate zone groupings.
- With Red Flag Warnings, the USFS and/or DNR may wish the NWS to distribute a public statement (RFD) to be distributed to the media. User agencies will provide guidance as to statement content and if they wish the Red Flag terminology to be used in the product.
- According to local policy a NWS office may broadcast a Red Flag Warning or Fire Weather Watch on NOAA Weather Radio.

User agencies will normally handle all public and media questions about fire potential and danger. The NWS will answer questions only about weather conditions, but should not comment on fire conditions

An example of a Red Flag Warning product is shown on the following page.

RED FLAG WARNING
NATIONAL WEATHER SERVICE EASTERN NORTH DAKOTA/GRAND FORKS ND
730 AM CDT SAT APR 15 2008

MN001>009-MN013>017-MN022>024-MN027-MN028-160100-
VETEC CODING INFORMATION

W POLK-NORMAN-CLAY-KITSON-ROSEAU-LAKE OF THE WOODS-W MARSHALL-
E MARSHALL-N BELTRAMI-PENNINGTON-RED LAKE-E POLK-N CLEARWATER-
MAHNOTMEN-S CLEARWATER-HUBBARD-W BECKER-E BECKER-
INCLUDING THE CITIES OF ROSEAU-THIEF RIVER FALLS-(FOSSTON)-
(BAUDETTE)-DETROIT LAKES-
730 AM CDT SAT APR 16 2007

...RED FLAG WARNING IN EFFECT FROM 1 PM TO 8 PM CST THIS EVENING FOR NORTHWEST
MINNESOTA FOR STRONG WINDS AND LOW HUMIDITY...

THE NATIONAL WEATHER SERVICE HAS ISSUED A RED FLAG WARNING FOR STRONG
SOUTHWEST WINDS AND LOW HUMIDITY THIS AFTERNOON AND EARLY EVENING FOR THAT
PORTION OF NORTHWEST MINNESOTA...WEST OF A LINE FROM BAUDETTE TO BEMIDJI TO
PARK RAPIDS AND NORTH FROM PARK RAPIDS TO DETROIT LAKES

A STRONG AREA OF LOW PRESSURE WILL BE TRACKING ACROSS SOUTHERN MANITOBA
THIS AFTERNOON. SOUTHWEST WINDS AHEAD OF THE LOW ARE EXPECTED TO INCREASE
TO 25 TO 30 MPH WITH GUSTS OVER 35 MPH. HUMIDITY IS EXPECTED TO DROP TO 20 TO 25
PERCENT WITH TEMPERATURES CLIMBING TO NEAR 80 DEGREES.

A STRONG COLD FRONT WILL PUSH ACROSS THE NORTH DAKOTA BORDER AROUND 6PM
AND SHOULD REACH THE BAUDETTE AND PARK RAPIDS AREA AROUND 10PM. WINDS WILL
SHIFT TO THE NORTHWEST AT 20 TO 25 MPH. TEMPERATURES WILL FALL SHARPLY WITH
HUMIDITY RECOVERING ABOVE 40 PERCENT AS THE FRONT PASSES. EXPECT SCATTERED
SHOWERS AND SOME THUNDERSTORMS NEAR THE COLD FRONT WITH RAINFALL AMOUNTS
AROUND .25.

PLEASE ADVISE THE APPROPRIATE OFFICIALS AND FIRE CREWS IN THE FIELD
OF THIS RED FLAG WARNING

\$\$

Figure 9. Example of a Red Flag Warning for a single segment event. Fire Weather Watches would follow the same format. This product could also be divided into multiple segments, especially in those cases where the watch or warning is for a large area.

Issued

Date _____
 Time _____
 Forecaster _____

Fire Weather Watch _____
 Red Flag Warning _____

Canceled

Date _____
 Time _____
 Forecaster _____

COORDINATION

WFO Minneapolis Time _____
 WFO Grand Forks Time _____
 WFO Green Bay Time _____
 WFO Duluth Time _____
 WFO La Crosse Time _____
 WFO Sioux Falls Time _____
 WFO Aberdeen Time _____

Make these CALLS prior to issuing the Watch or Warning**Minnesota Interagency Fire Center (MIFC)**

MIFC Dispatch (24 hours) 218-327-4558 FAX 218-327-4528 Time _____
 Minnesota DNR, at MIFC
 Doug Miedtke 218-327-4445 Cell 218-360-1813 Home 218-328-5270 Time _____

(note: if coordination with one of the above, they may be able to contact the other party for you)

If a National Forest is affected also call:

Brad McKelvy, Forest Dispatcher 218-327-4176 Pager 877-605-9942 Time _____
 Cell 218-244-0307

And when time permits call:

Eastern Area Interagency Coordination Center in Minneapolis / Duty Officer (24 Hour operation)
 612-713-7300 FAX 612-713-7317 Time _____

DISSEMINATION

RWF NWS office _____ Time _____
 Added to regularly scheduled narrative forecast. a.m. _____ p.m. _____
 Updated narrative: Yes _____ Time _____ No _____
 Public statement (coordinated with user agency) Time _____

Notes: _____

Figure 10. Fire Weather Watch and Red Flag Warning coordination checklist for NWS offices.

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c. Procedures and Access - Prior to the issuance of Watches and Warnings, NWS offices

will coordinate with the officials/agencies listed in the checklist above. When Fire Weather Watches and Red Flag Warnings are issued, they will be headlined in the products indicated in 4.b as well as in Spot Forecasts issued for the valid area. Fire Weather Watches and Red Flag Warnings will remain in effect through their expiration time, or until they are canceled or watches are upgraded to warnings. Red Flag Warnings and Fire Weather Watches are available soon after issuance via WIMS or on the web site of the NWS offices.

d. Verification - Fire weather program leaders will verify the Red Flag program. Results will be distributed the NWS Regional Fire Weather Program Managers as well as to the appropriate State and Federal user groups in Minnesota. Red Flag Warnings will be verified based on the Probability of Detection, False Alarm Rate, Critical Success Index, and Lead Time.

5. Participation in Interagency Groups - NWS offices providing fire weather services for Minnesota are expected to participate in the Annual State Fire Meeting. This meeting serves as a forum for interaction between NWS program leaders and their interagency users. It also provides an effective vehicle for discussions pertaining to changes to the AOP.

6. National Digital Forecast Database (NDFD) -

The NWS provides another forecast tool called the National Digital Forecast Database (NDFD). This database contains forecast weather parameters on a 2.5 to 5.0 kilometer grid. The NDFD runs through day 7, and is continually updated by NWS forecasters. Access to the NDFD is possible through NWS web pages by selecting GRAPHICAL from the dark blue menu bar on the left side of the NWS office homepage. Information on the NDFD can be found at the following link: <http://www.weather.gov/ndfd/>

B. SPECIAL SERVICES -The NWS provides a cadre of trained Incident Meteorologists (IMETs) who will provide on-site forecasting when requested by land management agencies. A certified IMET is on staff at the Minneapolis/Chanhassen NWS office. In addition to wildfires, IMETs may be dispatched to support:

- Large critical resource value prescribed burns. An example would be the Fuels Reduction Project in the Boundary Waters Area of Northeast Minnesota.
- Land management coordination and dispatch centers
- Hazardous substance release
- Any special projects or incidents which fall under the mandate of the NWS.

By Interagency Agreement, the NWS will support land management agency requests for on-site meteorological support for wildland fires through the IMET program. Other events listed above may be supported depending upon resource availability, if requested by federal fire agencies participating in the Interagency Agreement, or if requested by public safety officials who represent such support as essential to public safety.

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- 1) Only certified IMETS may be dispatched to support on-site service. The NWS is responsible for maintaining proficiency of designated IMETS.

- 2) The IMET or the Incident may request an Atmospheric Theodolite Meteorological Unit (ATMU) (NFES 1836) to obtain on-site upper level winds. Helium will also be ordered for the ATMU upon request.
- 3) IMET data needs will be obtained by one of four means:
 - a) Incident provides communications through a LAN
 - b) If incident does have wireless communication, then use Verizon Wireless Cards.
 - c) If no Verizon service in area, then use INMARSAT (satellite comms) at an estimated cost to the incident of at least \$500.00 per day.
 - d) Another possible, but slow option, is via a phone modem connection.
- 4) The NWS is responsible for assembly and operation of this equipment, calibration of instruments, ordering contract repair, and, if necessary, scheduling training sessions.
- 5) Request and dispatch of IMETs and equipment is accomplished through the National Resource Coordination System. If the IMET in Minneapolis is unavailable, the request will be likely be sent to the Eastern Area Coordination Center (EACC). They will in turn forward the request to the NWS National Fire Weather Operations Coordinator (NFWOC) in Boise who will fill the order. If the Minneapolis IMET is not available, the Meteorologist-in-Charge will promptly notify the dispatch center that the order cannot be filled.
- 6) Incident Operations - The IMET must be provided a work area free from rain and wind as well as telephone access. The line is typically shared with the Fire Behavior Analyst (FBAN). A source of power is also necessary (generator is OK). The IMET will work the hours and perform the forecast tasks required by the Incident Management Team. When a fire is declared contained or controlled, the IMET will assess the time requirement for further support in conjunction with the FBAN and Plans Section Chief.
- 7) Reimbursement for Services Provided - The NWS will be reimbursed for all costs associated with on-site operation as set forth in the Interagency National Agreement. (viewed at <http://www.weather.gov/directives>). See Section 10- Operations and Services, NWSI 10-4. These include all overtime costs associated with the deployment, travel costs and per diem, telecommunication services, as well as costs incurred by the NWS IMET duty station such as covering shifts vacated by the IMET. After each deployment, the IMET will prepare a Report of Reimbursable Expenses. The NWS will recover costs based on this report.
- 8) Upon release from an Incident, NWS offices will follow the Memorandum of Understanding between the NWS and NWS Employees Organization regarding rest periods for IMETs following a deployment.

1. Forecaster training - Any NWS forecaster producing fire weather forecasts needs to be trained. Forecasters must fulfill the following requirements as set forth in NWSI 10-405:

- a. Complete the NWS Fire Weather computer based learning module and S-290, Intermediate Wildland Fire Behavior (either by computer based training or residence training.)
- b. Local training generally consists of review of the AOP, the Fire Weather Station Duty Manual and other station instructions, as well as training established by the Fire Weather Program Leader or land management personnel.
- c. Forecasters must be familiar with NWS fire weather products and services and be proficient in their preparation and dissemination.

2. IMET Training and Certification requirements are detailed in NWSI 10-405.

3. NWS provided training to land management agencies - when NWS staff provide training to land management personnel, costs above planned salary and operating costs will be borne by benefiting agency(s). Billing procedures are described in the Interagency Agreement for Meteorological Services between the NWS and Land Management Agencies.

III. WILDLAND FIRE AGENCY SERVICES AND RESPONSIBILITIES

A. OPERATIONAL SUPPORT AND PREDICTIVE SERVICES - the GACC

Meteorologist at the Eastern Area Coordination Center (EACC) at Fort Snelling, Minnesota combines forecast information from NWS offices and other sources into area-wide summaries and briefings. This meteorologist, along with Fire Intelligence forms the Predictive Services group which produces fire weather/fire danger assessments for USFS Region 9 which includes Minnesota. These value added products enhance short and long range forecasts issued by the NWS to assist land managers in allocating fire-fighting resources. Products issued by the EACC are available on line at:

http://www.fs.fed.us/eacc/predictive_services/index.shtml

Mailing address:

Eastern Area Coordination Center
1 Federal Drive PO Box 29
St. Paul, MN 55111-4080
Phone 612-713-7300
Center Manager, Laura McIntyre-Kelly
Deputy Center Manager, Matt Dillon
Meteorologist, Stephen Marien

Physical address:

Eastern Area Coordination Center
BHW Federal Building
1 Federal Drive G-20
Fort Snelling, MN 55111

612-713-7315 cell 612-713-7322

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B. AGENCY COMPUTER SYSTEMS - The communication system used to link the NWS with its users is the Weather Information and Management System (WIMS). The NWS receives user agency observations entered into WIMS via its Advanced Weather

Interactive Processing System (AWIPS) computer system. Point and narrative forecasts are also sent to WIMS via this system. Observations and forecasts are exchanged between WIMS and AWIPS in the USFS Kansas City Computer Center.

C. FIRE WEATHER OBSERVATIONS - All fire weather observations in Minnesota are from automated sites, and all have GOES antennas installed for data transmission. Station inspection and instrument maintenance are the responsibility of land management agencies. NWS forecasters may monitor data quality from observation sites.

If a land management agency request that NWS personnel assist in setting up a RAWS station, the NWS will oblige per the National Agreement. Any NWS travel expenses for equipment maintenance or station visitation will, however, be reimbursed by the Wild Land Fire Agency making the request. The NWS Regional Fire Weather Program Leader (RFWPL) requests to be informed of any requests for new RAWS stations.

The NWS is responsible for assigning station numbers to NFDRS weather sites. The NWS local Fire Weather Program Leader will coordinate with the NWS RFWPL who will then work with appropriate land management personnel and WIMS staff to determine the 6-digit station ID.

Once the station ID is coordinated/determined, the NWS RFWPL will provide it to the requestor and responsible NWS office. It is the responsibility of the requestor/land management personnel to notify WIMS staff of RAWS station status.

Some Internet sites available to view fire weather observations include:

<http://raws.wrh.noaa.gov/roman>

<http://www.wrcc.dri.edu/wraws/mnF.html>

<http://www.met.utah.edu/mesowest/> (this site contains a very useful interactive map)

Fire Weather Stations
 Airport ASOS and AWOS sites
 NWS County Warning Areas

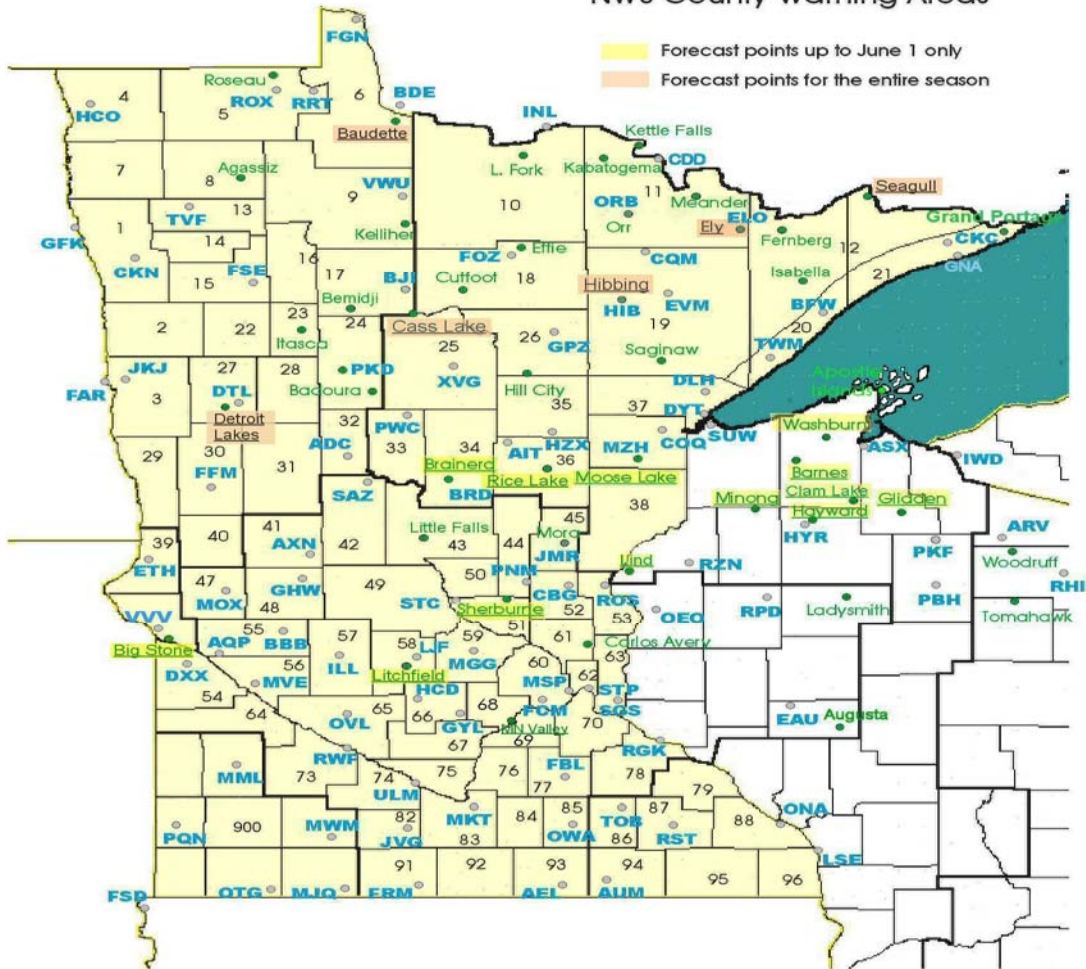


Figure 11. Locations of fire weather observation points and automated airport observing systems. The names shaded with yellow receive point forecasts until June 1st. Ely, Seagull, Hibbing and Cass Lake, shaded in red, receive point forecasts throughout the season. At the request of land managers, point forecasts for any site can be continued past June 1st, or resumed at a later date if necessary.

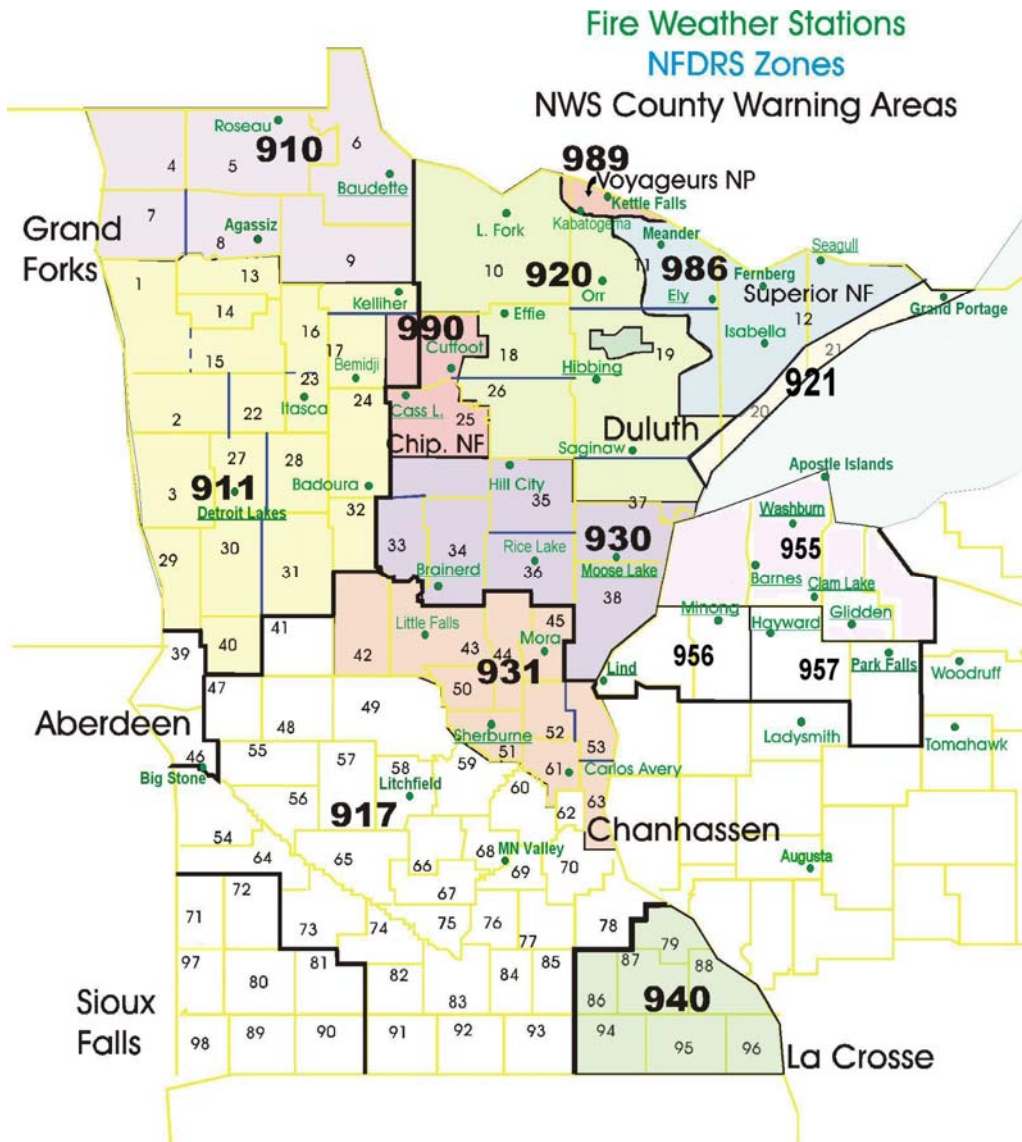


Figure 12 NFDRS zones and the agency observation points.

Automated Fire Weather Stations in Minnesota

Station name	Number	Zone	Lat	Lon	Elev						
Minnesota DNR											
Baudette	210301	910	48.67	94.62	1083						
Badoura	211502	911	46.86	94.73	1420	Orr	210514	920	48.02	92.86	1325
Bemidji	210901	911	47.50	94.93	1377	Itasca	211401	911	47.24	95.19	1450
Brainerd	212601	930	46.40	94.13	1220	Kelliher	210902	911	47.94	95.46	1350
Carlos Avery	214201	931	45.30	93.10	900	Littlefork	210405	920	48.39	93.56	1158
Effie	211004	920	47.78	93.65		Moose Lake	211803	930	46.42	92.80	1070
					1340	Mora	213301	931	45.89	93.27	1012
Hibbing	210512	920	47.39	92.83	1350	Little Falls	213102	931	45.95	94.34	1125
Hill City	211702	930	47.04	93.60	1340						
Saginaw	210511	920	46.84	92.46	1330	U.S. Forest Service					
Roseau	210203	910	48.85	95.70	1047	Meander	210503	986	48.12	92.02	1520

Cass Lake	211604	990	47.38	94.60	1320	Ely	210509	986	47.89	91.87	1470
Cutfoot	211005	990	47.54	94.05	1330	Fernberg	210607	986	47.95	91.49	1700
(26)						U.S. Fish and Wildlife Service					
<u>Station name</u>	<u>Number</u>	<u>Zone</u>	<u>Lat</u>	<u>Lon</u>	<u>Elev</u>	MN Valley	215601	917	44.72	93.64	845
Seagull	210709	986	48.12	90.84	1480	Litchfield	214501917		45.07	94.53	1075
Isabella	210602	986	47.63	91.41	1990	Rice Lake	211703	930	46.54	93.29	1185
National Park Service						Big Stone	213501	917	45.26	96.34	878
Kabetogema	210507	989	48.44	93.05	1200	Detroit Lakes	212201	911	46.85	95.85	1385
Kettle Falls	210516	989	48.50	92.64	1160	Agassiz	210801	910	48.50	95.87	1174
						Sherburne	214001	931	45.53	93.75	1002
						Grand Portage Agency					
						Grand Portage	210703	921	47.95	89.78	1200

D. REIMBURSEMENT FOR NWS PROVIDED ON-SITE SUPPORT AND TRAINING --
 Agencies will reimburse the NWS for all costs incurred for IMET support as well as for training assistance or station visitation.. Procedures are detailed in the Interagency National Agreement.

IV. JOINT RESPONSIBILITIES

A. Meteorological training can be provided either by NWS or the EACC meteorologist. Each NWS office has at least one person, typically the Fire Weather Program Leader, who is qualified to teach courses at least through Intermediate Fire Behavior (S-290). Requests for NWS training should be directed to that office's Fire Weather Program Leader or MIC. Sufficient advance notice should be given to allow for preparation as well as scheduling. Costs incurred by the NWS will be reimbursed by the requesting agency.

B. NWS Fire Weather Program Leaders will participate in coordination conference calls, primarily in the spring fire season. This duty will be shared by the program leaders and the EACC Meteorologist. This representative should be prepared to provide a statewide briefing highlighting significant weather trends as well as possible critical fire weather situations. Participants are asked to keep their input brief and to the point, lasting less than 5 minutes. When calls are held twice-weekly, weather information should go out 5 days. When calls are held once-weekly, weather information should include the next 7 days. An internet fire weather briefing page is hosted by NWS Duluth at <http://weather.gov/dlh/firewx.php>

V. EFFECTIVE DATES ON THE AOP

This document will be effective approximately from March 1, 2008 to March 1, 2009.

VI. AGENCY SIGNATURES

Daniel Luna, MIC NWS Chanhassen _____/Signed/date
 representing all NWS offices with fire weather forecast responsibility in Minnesota

Ron Stoffel, MN DNR _____ Signed/date
 MNICS Task Force Chairman
 Signing for MN DNR and All Federal Land Managers

