

# 2008 North Dakota Fire Weather Operating Plan

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## I. Introduction

This Annual Operating Plan (AOP) is a procedural guide, based on the National Interagency Agreement for Meteorological Services, which describes fire meteorological services provided within North Dakota. The AOP is updated annually after review by representatives of the National Weather Service (NWS) and each user agency in North Dakota.

## II. Service Area and Organizational Directory

Fire meteorological services in North Dakota are provided by the National Oceanic and Atmospheric (NOAA) National Weather Service (NWS) offices in Bismarck and Grand Forks. The NWS weather forecast office (WFO) in Bismarck is responsible for the fire weather program in western and central North Dakota (Fire Weather zone 134). The NWS WFO in Grand Forks is responsible for eastern North Dakota (Fire Weather zone 135). See Figure 1. The normal fire weather season begins in early April and continues to around the end of October. The season will vary according to the actual weather. Fire weather forecasts and other fire weather related information can be found on the Bismarck and Grand Forks Internet web pages:

<http://www.crh.noaa.gov/bis/> or <http://www.crh.noaa.gov/fgf/>

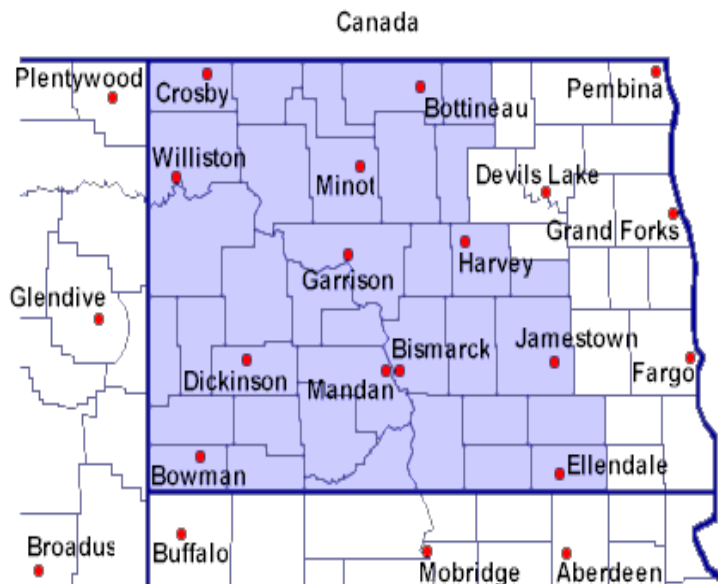


Figure 1. Fire Weather Zone 134 (shaded). Unshaded portions of North Dakota are Fire Weather Zone 135.

## **A. Agency Contact Points:**

### **National Weather Service:**

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Operational Services Meteorologist  
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Andrew L. Randall, Dispatch Center Manager  
3425 Miriam Ave  
Bismarck, ND 58501  
701-333-0260      701-333-0263 (Andy's direct line)  
701-202-7334 – cell    701-255-4015 (Andy's home phone)  
701-333-0269 - fax  
[ndndc@dms.nwcg.gov](mailto:ndndc@dms.nwcg.gov)

Lily Husky, Lead Dispatcher  
701-333-0262 (Lily's direct line)  
[ndndc@dms.nwcg.gov](mailto:ndndc@dms.nwcg.gov)

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701-250-4454 – fax  
701-222-0997 – home  
[msand@fs.fed.us](mailto:msand@fs.fed.us)

Beth Card, FMO Medora District  
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Dickinson, ND 58601  
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701-227-7851 (Beth’s direct line)  
701-227-7801 - fax  
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701-842-3008 - fax  
701-770-3527 - cell  
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701-328-9947 - fax  
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701-328-8100  
Amy Anton, Operations and Planning Chief  
[ajanton@nd.gov](mailto:ajanton@nd.gov)

**Bureau of Indian Affairs**

Morgan Beveridge, Fuels Manager  
BIA-Great Plains Region  
Natural Resources, MC-301  
115 4th Avenue SE  
Aberdeen, SD 57401  
605-226-7621 - office  
605-216-5936 - cell  
605-226-7358 – fax  
[a00fm1@gmail.com](mailto:a00fm1@gmail.com)

## Northern Rockies Predictive Services

Fire Weather Program Manager

5765 West Broadway Street

Missoula, MT 59808

406-329-4703

406-829-6901 - fax

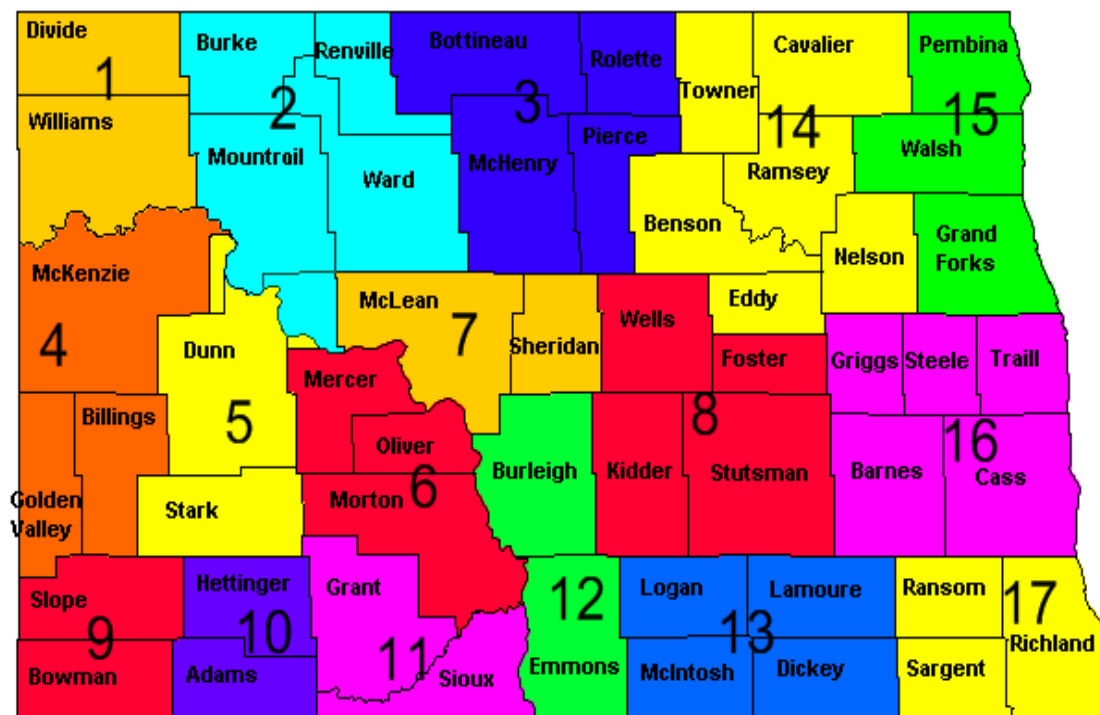
[www.fs.fed.us/r1/fire/nrcc/](http://www.fs.fed.us/r1/fire/nrcc/)

### III. Services Provided by the NOAA National Weather Service

#### A. Basic Services

##### 1. Rangeland Fire Danger Forecast (routine issuance)

This product is issued by the Bismarck NWS office (upon collaboration with forecasters at NWS Grand Forks). The product covers **all** of North Dakota, which is broken up into 17 separate fire danger groups (Figure 2). It is issued daily around 5:00 am Central time during the fire weather season. It is a forecast of the potential for non-agricultural grasslands to carry fire. It is based on the temperature, humidity, wind, sky cover and the estimated “greenness” of the fuel. The highest threat period for the rangeland fire danger is usually before the spring green-up and again in the fall. This product is intended for public use as well as for state and local authorities. The product will be updated if conditions vary significantly from those forecast. The Rangeland Fire Danger Forecast (RFD) contains the numerical values generated when determining the Rangeland Fire Danger Index for each RFD Group. These numbers may be useful to local fire management officials for daily planning and preparedness purposes. See Appendix A.1 for an example of this product.



North Dakota Rangeland Fire Danger Index County groups

Figure 2. Groupings used in the Rangeland Fire Danger Forecast.

Rangeland Fire Danger Numerical Values	Rangeland Fire Danger Index Rating
95 +	Extreme
71 – 94	Very High
51 – 70	High
31 – 50	Moderate
0 - 30	Low

Figure 3. Rangeland Fire Danger numerical values and the corresponding index ratings.

## 2. Fire Weather Planning Forecast (routine issuance)

This forecast product is issued twice daily during the fire weather season. The planning forecast will be issued near 4 a.m. and 4 p.m. Central time. The morning issuance will be updated for observed sounding information near 730 a.m. Central time. The Bismarck sounding update will contain inversion information, while the Grand Forks update will mention the observed Haines index.

The morning forecast contains a brief weather discussion, forecasts for today, tonight and tomorrow, and a general 3 to 7-day forecast. The afternoon forecast covers the periods of tonight, tomorrow, tomorrow night, the following day, and a general 3 to 7-day forecast. The product will be updated as needed. The “Discussion” should be tailored to address items of importance to the fire weather forecast. Persistent errors or biases in the forecast should be brought to the attention of the NOAA NWS. The local optional elements may vary from office to office.

The Bismarck planning forecast optional local elements will be the mid-level Haines index (Appendix D), LAL (Appendix E), Chance of Wetting Rain (CWR >.10 inches), transport wind, mixing height and smoke dispersal (Appendix F). See Appendix A.2 for examples of these products.

The Grand Forks optional local elements will be the mid-level Haines index, LAL, Precipitation amount, hours of sunshine, transport wind, mixing height, and smoke dispersal.

## 3. National Fire Danger Rating System Forecasts (routine issuance)

The National Fire Danger Rating System (NFDRS) is designed to represent the fire potential at peak burning conditions over a large area, generally in excess of 100,000 acres. The NWS offices in Bismarck and Grand Forks provide a point forecast for RAWS stations utilized in the forecast NFDRS program. The point forecast is used in the Weather Information Management System (WIMS) forecast NFDRS calculations.

The following RAWS sites will receive point forecasts daily during the fire season:

### NWS Bismarck

Crosby	320101	Watford City	321703
Painted Canyon	321704	Sand Creek	323804
Lostwood	320220	Knife River	322701
J. Clark Salyer	322901	Long Lake	322901
Arrowwood	323536		

### NWS Grand Forks

Hampden	320701	Sheyenne	324605
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The 1400 LDT RAWS observations will be available in WIMS near 1415 LDT, and received in the NWS forecast offices by 1445 LDT. The point forecasts should be sent to WIMS by 1545 LDT. Forecasted NFDRS indices are valid 24 hours from the current day's 1400 LDT observation. They should be available in WIMS by 1615 LDT.

The Following is an explanation of codes used in NFDRS Forecasts. See Appendix A.3 for an example.

FCST, STATION#, YYMMDD, 13, WX, TEMP, RH, LAL1, LAL2, WIND, TX, TN, RHx, RHn, PD1, PD2, WETF

FCST: Indicates individual site forecasts.

STATION#: NFDRS site number

YYMMDD: Date

13: Valid Forecast Time (Always 13 to indicate 1300 LST)

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

- 0 clear
  - 1 scattered clouds (1/8 to 4/8)
  - 2 broken clouds (5/8 to 7/8)
  - 3 overcast clouds (more than 7/8)
  - 4 foggy
  - 5 drizzle
  - 6 raining
  - 7 snowing or sleet
  - 8 showers (in sight or at the station)
  - 9 thunderstorm
- (Categories 5, 6, 7 sets most NFDRS indices to 0.  
ERC is the exception)

TEMP: Temperature in degrees F valid at 1300 LST

RH: Relative humidity in percent valid at 1300 LST

LAL1: Lightning Activity Level 1400 LST to 2300 LST

LAL2: Lightning Activity Level 2300 LST to 2300 LST

WIND: Wind speed in mph valid at 1300 LST

TX: Maximum temperature from 1300 LST to 1300 LST tomorrow

TN: Minimum temperature from 1300 LST to 1300 LST tomorrow

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

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

PD1: Precipitation duration in hours 1300 LST to 0500 LST

PD2: Precipitation duration in hours 0500 LST to 1300 LST

WETF Y or N: Wet flag, yes or no. This indicates whether or not fuels will be wet at 1300 LST.

#### 4. Fire Weather Watch/Red Flag Warning (non-routine issuance)

These products are essential to the safety of the fire crews. Because of this, a Red Flag Warning should be issued even if the event appears to be borderline. Coordination with surrounding offices and land management agencies is essential. Red flag warnings should be issued any time of the day if conditions warrant.

- 1) A Fire Weather Watch will be issued when the potential for Red Flag conditions are expected in the next 12 to 72 hours.
- 2) A Red Flag Warning will be issued if the Red Flag criteria, given below, are expected to be met within the next 24 hours, are imminent or are occurring.

The Red Flag information will be included as a “headline” in the daily planning forecast. It will also be disseminated as a special product that is available on the Internet and NOAA Weather Wire. In addition, the North Dakota Interagency Dispatch Center will be notified by phone at 701-333-0260 (after hours, and on weekends, call the duty officer at 701-255-4015).

A Red Flag event is defined as weather conditions which could sustain extensive wildfire activity and meet one or more of the following criteria in conjunction with Very High or Extreme fire danger:

- a. Sustained surface winds, or frequent gusts, of 25 mph or higher.
- b. Unusually hot and dry conditions (e.g. RH less than 20 %).
- c. Dry thunderstorm activity is foreseen during an extremely dry period.
- d. Any time the forecaster foresees a change in weather that would result in a significant increase in fire danger (e.g. very strong winds associated with a cold front even though the rangeland fire danger index is below the very high category, extensive lightning, etc).

See Appendix B for the Relative Humidity and Wind “Red Flag Decision Chart” utilized as a “first look” in the need of a red flag warning.

An example of the fire weather watch and red flag warning product is provided in Appendix A.4.

#### 5. Spot Forecasts (non-routine issuance)

##### a. Policy

- Spot Forecasts will be issued upon request of any federal, state, tribal, or local official in support of a **wildfire**.
- Upon request of any **federal official** as required under the Interagency Agreement
- Upon request of any state, tribal, or local official **in coordination with any federal land management agency**.
- Upon request of any public safety official when **essential to public safety**
- Will **not** provide to private citizens or commercial entities not acting as an agent of a government agency.

##### b. Procedure for Requesting Spot Forecasts

The preferred method to request a spot forecast is via the internet web pages at <http://www.crh.noaa.gov/bis/> or <http://www.crh.noaa.gov/fgf/>.



The Spot Forecast will be posted to the web page, and can be faxed to the requesting agency upon request. Our goal is to provide a forecast within 30 minutes of the request; however, higher priority duties may occasionally delay the spot forecast. An updated Spot Forecast may be requested if it appears conditions are significantly different than those forecast. User feedback on the Spot Forecasts is strongly encouraged.

Requests for Spot forecasts to WFO Bismarck (Fire Zone 134) can also be made using WS Form D-1 or equivalent (Figure 5b). Normally, requests/forms should be submitted by fax (701-250-4450). Topographic information and observed weather conditions should be provided when appropriate/available. Phone inquiries should be directed to 701-250-4494. For Spot Forecast service in eastern North Dakota (Fire Zone 135), call WFO Grand Forks at 701-795-5127.

The NWS will strive to provide as much detail as possible in the wind forecast. This includes specific wind shift times, wind gusts, etc.

### c. Weather Elements Included in Spot Forecasts

Discussion - A brief synopsis of weather features affecting the area

Sky/Weather, Maximum/Minimum temperature, Maximum/Minimum relative humidity, and 20 foot Winds (including shifts and gusts)

Optional Elements (Bismarck) – Mid-level Haines index, transport wind, mixing depth, LAL, and Chance of wetting rain (>.10 inches).

Optional Elements (Grand Forks) - Mid-level Haines index, LAL, Precipitation amount, hours of sunshine, transport wind, mixing height, and smoke dispersal.

See Appendix A.5 for an example of a Spot Forecast.

## B. Special Services

### 1. Incident Meteorologist (IMET) Service

If a wildfire is, or is expected to be, uncontrollable, and loss of life and/or considerable property damage is a possibility, the land management agency may request an on-site deployment of a trained and certified NWS Incident Meteorologist (IMET). The NWS IMET provides the Incident Command Team with 24-hour on-site fire weather support. The IMET's equipment requires at least one phone line, electrical power and a dry shelter at, or near, the command site. To request an IMET deployment, contact the ND Dispatch Center. Expenses are the responsibility of the requesting agency.

## IV. Wildland Fire Agency Services and Responsibilities

### A. RAWS Station Identification Numbers

The following steps are necessary in order to correctly provide a new RAWS station with its identification number:

- 1) The land management agency responsible for the new site will provide preliminary information on the plans for a new station. This information will be provided to the NWS Central Region Operational Services Meteorologist (Gary Schmeling, available at [Gary.Schmeling@noaa.gov](mailto:Gary.Schmeling@noaa.gov) or 816-268-3143). The preliminary information should also be shared with the local NWS office. The NWS will provide input on siting criteria of the site if requested by the land management agency.

- 2) A formal request for the six-digit RAWS identification number will be provided to the responsible NWS office, or directly to the Central Region Headquarters Operational Service Meteorologist.
- 3) The regional Operational Services Meteorologist will coordinate with the local NWS office, appropriate land management personnel, and the WIMS staff in order to determine the proper RAWS identification number. Note that the first two digits of the identification number denote the state (in ND, the number is 32), the second pair of digits denotes the county, and the last pair of digits denotes the particular station in that county. In each county, once a station is given a number, that identification number can no longer be used, even if that station becomes inactive.
- 4) The regional Operational Services Meteorologist will provide the RAWS identification number to the requesting land management agency and the appropriate NWS office.
- 5) The land management agency will notify WIMS in order to assure that the observations are received and sent from the system.

## V. Appendices

### A. NWS Product Examples

#### 1. Rangeland Fire Danger Forecast

RFDBIS

NORTH DAKOTA RANGELAND FIRE DANGER STATEMENT  
 NATIONAL WEATHER SERVICE BISMARCK ND  
 348 AM CDT FRI APR 6 2007

DISCUSSION...HIGH PRESSURE IN CANADA WILL DROP DOWN OVER THE STATE TODAY. WINDY CONDITIONS CAN BE EXPECTED LATE THIS MORNING INTO THE AFTERNOON ACROSS CENTRAL AND EASTERN NORTH DAKOTA. SNOW COVER AND COOL TEMPERATURES WITH AFTERNOON RELATIVE HUMIDITIES IN THE 30S NORTH CENTRAL TO LOWER 50S SOUTH WILL KEEP THE RANGELAND FIRE DANGER INDEX IN THE LOW CATEGORY.

RFD GROUP 1...DIVIDE...WILLIAMS...  
 RFD INDEX=LOW.  
 RFD VALUE=17.

RFD GROUP 2...BURKE...FT BERTHOLD EAST RIVER...MOUNTRAIL...  
 RENVILLE...WARD...  
 RFD INDEX=LOW.  
 RFD VALUE=18.

RFD GROUP 3...BOTTINEAU...MCHENRY...PIERCE...ROLETTE...  
 RFD INDEX=LOW.  
 RFD VALUE=21.

RFD GROUP 4...BILLINGS...GOLDEN VALLEY...MCKENZIE...  
 RFD INDEX=LOW.  
 RFD VALUE=4.

RFD GROUP 5...DUNN...FT BERTHOLD WEST RIVER...STARK...  
 RFD INDEX=LOW.  
 RFD VALUE=4.

RFD GROUP 6...MERCER...MORTON...OLIVER...  
RFD INDEX=LOW.  
RFD VALUE=4.

RFD GROUP 7...MCLEAN...SHERIDAN...  
RFD INDEX=LOW.  
RFD VALUE=4.

RFD GROUP 8...FOSTER...KIDDER...STUTSMAN...WELLS...  
RFD INDEX=LOW.  
RFD VALUE=5.  
RFD GROUP 9...BOWMAN...SLOPE...  
RFD INDEX=LOW.  
RFD VALUE=4.

RFD GROUP 10...ADAMS...HETTINGER...  
RFD INDEX=LOW.  
RFD VALUE=4.

RFD GROUP 11...GRANT...SIOUX...  
RFD INDEX=LOW.  
RFD VALUE=4.

RFD GROUP 12...BURLEIGH...EMMONS...  
RFD INDEX=LOW.  
RFD VALUE=4.

RFD GROUP 13...DICKEY...LAMOURE...LOGAN...MCINTOSH...  
RFD INDEX=LOW.  
RFD VALUE=5.

RFD GROUP 14...BENSON...CAVALIER...EDDY...NELSON...RAMSEY...  
TOWNER...  
RFD INDEX=LOW.  
RFD VALUE=22.

RFD GROUP 15...GRAND FORKS...PEMBINA...WALSH...  
RFD INDEX=LOW.  
RFD VALUE=5.

RFD GROUP 16...BARNES...CASS...GRIGGS...STEELE...TRAILL...  
RFD INDEX=LOW.  
RFD VALUE=5.

RFD GROUP 17...RANSOM...RICHLAND...SARGENT...  
RFD INDEX=LOW.  
RFD VALUE=5.

OUTLOOK FOR TOMORROW...THE FIRE DANGER INDEX WILL BE IN THE LOW CATEGORY.

CONTACT LOCAL FIRE OFFICIALS...THE STATE FIRE MARSHALL  
OR THE NORTH DAKOTA DEPARTMENT OF EMERGENCY SERVICES FOR  
INFORMATION ON RESTRICTIONS OR PROHIBITIONS. VISIT THE DES WEBSITE  
[WWW.ND.GOV/DES/INFO/FIREDANGER.HTML](http://WWW.ND.GOV/DES/INFO/FIREDANGER.HTML)

## 2. Fire Weather Planning Forecast

FIRE WEATHER PLANNING FORECAST (MORNING)

NATIONAL WEATHER SERVICE

TIME-DATE

...HEADLINE... (REQUIRED FOR RED FLAG WARNINGS AND FIRE WEATHER WATCHES...RECOMMENDED FOR SIGNIFICANT FEATURES AT OTHER TIMES)

.DISCUSSION...

NDZXXX-XXX>XXX-DDHHMM-

GEOGRAPHICAL DESCRIPTORS

...RED FLAG WARNING/FIRE WEATHER WATCH HEADLINE... (AS NEEDED)

.TODAY...

SKY/WEATHER.....

MAX TEMPERATURE....

24 HR TREND.....

MIN HUMIDITY.....

24 HR TREND.....

WIND (20 FT)..../.....

OPTIONAL ELEMENTS...

.TONIGHT...

SKY/WEATHER.....

MIN TEMPERATURE...

24 HR TREND.....

MAX HUMIDITY.....

24 HR TREND.....

WIND (20 FT).....

OPTIONAL ELEMENTS...

.TOMORROW...

SKY/WEATHER.....

MAX TEMPERATURE...

MIN HUMIDITY.....

WIND (20 FT).....

OPTIONAL ELEMENTS....

.FORECAST DAYS 3 THROUGH 7... (WINDS MUST BE INCLUDED DAYS 3-5)

.DAY3... (DAYS CAN BE COMBINED)

.DAY4...

.DAY5...

.DAY6...

.DAY7...

\$\$

[FORECAST FOR NEXT GEOGRAPHICAL DESCRIPTOR AND FIRE WEATHER ZONE GROUP]

\$\$

FIRE WEATHER PLANNING FORECAST (AFTERNOON)

NATIONAL WEATHER SERVICE

TIME-DATE

...HEADLINE... (REQUIRED FOR RED FLAG WARNINGS AND FIRE WEATHER WATCHES...SIGNIFICANT FEATURES AT OTHER TIMES RECOMMENDED)

.DISCUSSION...

NDZXXX-XXX>XXX-DDHHMM-

GEOGRAPHICAL DESCRIPTORS

...RED FLAG WARNING/FIRE WEATHER WATCH HEADLINE... (AS NEEDED)

.TONIGHT...

SKY/WEATHER.....

MIN TEMPERATURE...

24 HR TREND.....

MAX HUMIDITY.....

24 HR TREND.....

WIND (20 FT).....

OPTIONAL ELEMENTS...

.TOMORROW...

SKY/WEATHER.....

MAX TEMPERATURE...

24 HR TREND.....

MIN HUMIDITY.....

24 HR TREND.....

WIND (20 FT).....

OPTIONAL ELEMENTS...

.TOMORROW NIGHT...

SKY/WEATHER.....  
MIN TEMPERATURE...  
MAX HUMIDITY.....  
WIND (20 FT).....  
OPTIONAL ELEMENTS...

.FOLLOWING DAY...  
SKY/WEATHER.....  
MAX TEMPERATURE...  
MIN HUMIDITY.....  
WIND (20 FT).....  
OPTIONAL ELEMENTS...

.FORECAST DAYS 3 THROUGH 7... (WINDS MUST BE INCLUDED DAYS 3-5)  
.DAY3... (DAYS CAN BE COMBINED)  
.DAY4...  
.DAY5...  
.DAY6...  
.DAY7...

\$\$  
[FORECAST FOR NEXT GEOGRAPHICAL DESCRIPTOR AND FIRE WEATHER ZONE GROUP]

\$\$

### 3. National Fire Danger Rating System Forecasts

The following is an example of the point forecast for the RAWS sites in the Bismarck forecast area. The Grand Forks product will look the same, but will be for the RAWS sites in their forecast area.

FNUS83 KBIS 052145  
FWMBIS

FCST, 320101, 080406, 13, 1, 9, 67, 1, 1, N, 08, , 19, -3, 100, 67, 0, 0, N  
FCST, 320101, 080406, 13, 1, 5, 72, 1, 1, NNW, 10, , 21, -5, 96, 65, 0, 0, N  
FCST, 320101, 080406, 13, 1, 0, 83, 1, 1, NNW, 12, , 15, -9, 95, 58, 0, 0, N  
FCST, 320101, 080406, 13, 1, 14, 64, 1, 1, N, 10, , 25, 2, 87, 57, 0, 0, N  
FCST, 320101, 080406, 13, 1, 20, 62, 1, 1, NNW, 10, , 30, 6, 96, 49, 0, 0, N  
FCST, 320101, 080406, 13, 1, 11, 55, 1, 1, NNW, 12, , 25, 2, 79, 50, 0, 0, N  
FCST, 320101, 080406, 13, 1, 12, 59, 1, 1, NNW, 12, , 25, 4, 80, 46, 0, 0, N  
FCST, 320101, 080406, 13, 1, 4, 74, 1, 1, NNW, 12, , 10, -6, 95, 61, 0, 0, N  
FCST, 320101, 080406, 13, 2, 22, 65, 1, 1, NNW, 11, , 30, 9, 91, 49, 0, 0, N

#### 4. Fire Weather Watches and Red Flag Warnings

RED FLAG WARNING/(FIRE WEATHER WATCH)

NATIONAL WEATHER SERVICE BISMARCK ND

400 AM CDT SAT OCT 1 2005

...RED FLAG WARNING IN EFFECT FROM 1 PM CDT /12 PM MDT/ THIS AFTERNOON TO 8 PM CDT /7 PM MDT/ THIS EVENING FOR STRONG WINDS AND LOW RELATIVE HUMIDITIES FOR WESTERN NORTH DAKOTA...

.STRONG SOUTHEAST WINDS...UNSEASONABLY WARM TEMPERATURES...RELATIVE HUMIDITIES DECREASING TO THE TEENS AND DRY PASTURE CONDITIONS WILL PRODUCE HAZARDOUS FIRE WEATHER CONDITIONS THIS AFTERNOON AND EVENING OVER WESTERN NORTH DAKOTA.

NDZ009-017-018-031>033-040-041-043-044-011700-

/O.NEW.KBIS.FW.W.0006.051001T1800Z-051002T0100Z/

WILLIAMS-MCKENZIE-DUNN-GOLDEN VALLEY-BILLINGS-STARK-SLOPE-HETTINGER-BOWMAN-ADAMS-

400 AM CDT SAT OCT 1 2005

...RED FLAG WARNING IN EFFECT FROM 1 PM CDT /12 PM MDT/ THIS AFTERNOON TO 8 PM CDT /7 PM MDT/ THIS EVENING FOR STRONG WINDS AND LOW RELATIVE HUMIDITIES FOR WESTERN NORTH DAKOTA...

THE NATIONAL WEATHER SERVICE IN BISMARCK HAS ISSUED A RED FLAG WARNING...WHICH IS IN EFFECT FROM 1 PM CDT /12 PM MDT/ THIS AFTERNOON TO 8 PM CDT /7 PM MDT/ THIS EVENING.

STRONG SOUTHEAST WINDS...UNSEASONABLY WARM TEMPERATURES...RELATIVE HUMIDITIES DECREASING TO THE TEENS AND DRY PASTURE CONDITIONS WILL PRODUCE HAZARDOUS FIRE WEATHER CONDITIONS THIS AFTERNOON AND EVENING OVER WESTERN NORTH DAKOTA.

A RED FLAG WARNING MEANS THAT CRITICAL FIRE WEATHER CONDITIONS ARE EITHER OCCURRING NOW...OR WILL SHORTLY. A COMBINATION OF STRONG WINDS...LOW RELATIVE HUMIDITIES...VERY WARM TEMPERATURES AND DRY PASTURE CONDITIONS WILL CREATE WILDFIRE GROWTH POTENTIAL.

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## 5. Spot Forecasts

SPOT FORECAST FOR (NAME OF INCIDENT OR SITE)

NATIONAL WEATHER SERVICE

TIME-DATE

IF CONDITIONS BECOME UNREPRESENTATIVE, CONTACT THE NATIONAL WEATHER SERVICE.

...HEADLINE... (REQUIRED IF FIRE WEATHER WATCH/RED FLAG WARNING IN EFFECT)

DISCUSSION...

FIRST PERIOD

SKY/WEATHER.....

TEMPERATURE.....

HUMIDITY.....

WIND (20 FT).....

OPTIONAL ELEMENTS...

SECOND PERIOD

SKY/WEATHER.....

TEMPERATURE.....

HUMIDITY.....

WIND (20 FT).....

OPTIONAL ELEMENTS...

THIRD PERIOD

SKY/WEATHER.....

TEMPERATURE.....

HUMIDITY.....

WIND (20 FT).....

OPTIONAL ELEMENTS...

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FORECASTER...

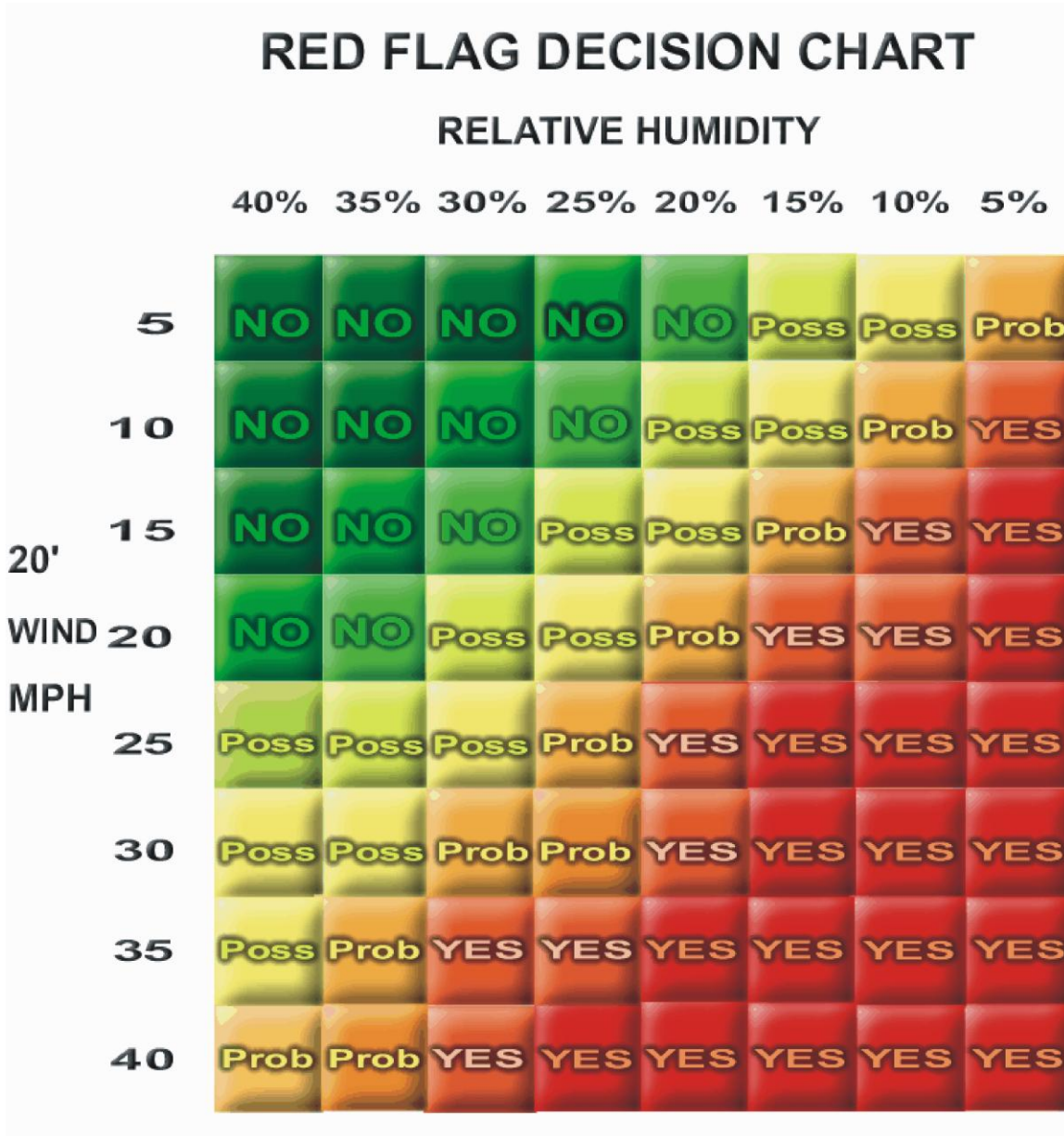
REQUESTING OFFICIAL...

REASON FOR REQUEST...



## B. Red Flag Decision Chart

The following red flag decision matrix, based on increasing wind and lowering relative humidity, is used as a “first look” when considering the need for a Red Flag Warning. The chart is meant as a guide, and is not absolute.



**RED FLAG DECISION MATRIX**

<b>NO</b>	No Red Flag Warning needed.
<b>POSS</b>	Possible Red Flag Warning; Not likely, but may be needed depending upon criteria in addition to wind speed and RH.
<b>PROB</b>	Probable Red Flag Warning; Likely warranted, depending upon other red flag criteria in addition to wind speed and RH.
<b>YES</b>	Red Flag Warning needed based solely on wind speed and RH.

### C. Spot Forecast Fax Request Form and Instructions

WS FORM D-1 (1-2005) (Supersedes Previous Editions)		<b>SPOT REQUEST</b> (See reverse for instructions)				U.S. Department of Commerce NOAA National Weather Service						
Please call the NWS Weather Forecast Office (WFO) when submitting a request and also after you receive a forecast to ensure request and forecast were received. Please provide feedback to WFO on forecast.												
1. Time†		2. Date		3. Name of Incident or Project			4. Requesting Agency					
5. Requesting Official			6. Phone Number			7. Fax Number		8. Contact Person				
9. Ignition/Incident Time and Date		12. Reason for Spot Request (choose one only) <input type="radio"/> <b>Wildfire</b> <input type="radio"/> <b>Non-Wildfire</b> Under the Interagency Agreement for Meteorological Services (USFS, BLM, NPS, USFWS, BIA) <input type="radio"/> <b>Non-Wildfire</b> State, tribal or local fire agency working in coordination with a federal participant in the Interagency Agreement for Meteorological Services <input type="radio"/> <b>Non-Wildfire</b> Essential to public safety, e.g. due to the proximity of population centers or critical infrastructure.					13. Latitude/Longitude:					
10. Size (Acres)							14. Elevation (ft, Mean Sea Level) Top:                      Bottom:					
11. Type of Incident <input type="radio"/> <b>Wildfire</b> <input type="radio"/> <b>Prescribed Fire</b> <input type="radio"/> <b>Wildland Fire Use (WFU)</b> <input type="radio"/> <b>HAZMAT</b> <input type="radio"/> <b>Search And Rescue (SAR)</b>							15. Drainage					
		16. Aspect		17. Sheltering <input type="radio"/> <b>Full</b> <input type="radio"/> <b>Partial</b> <input type="radio"/> <b>Unsheltered</b>								
18. Fuel Type: <input type="checkbox"/> Grass <input type="checkbox"/> Brush <input type="checkbox"/> Timber <input type="checkbox"/> Slash <input type="checkbox"/> Grass/Timber Understory <input type="checkbox"/> Other _____ Fuel Model: 1,2,3    4,5,6,7    8,9,10    11,12,13    2,5,8												
19. Location and name of nearest weather observing station (distance & direction from project):												
20. Weather Observations from project or nearby station(s): (Winds should be in compass direction e.g. N, NW, etc.)												
Place		Elevation	†Ob Time	20 ft. Wind		Eye Level Wind.		Temp.		Moisture		Remarks (Relevant Weather, etc)
				Dir	Speed	Dir	Speed	Dry	Wet	RH	DP	
21. Requested Forecast Period Date			22. Primary Forecast Elements (Check all that are needed) (for management ignited wildland fires, provide prescription parameters):					23. Remarks (other needed forecast elements, forecast needed for specific time, etc.)				
Start _____			Needed:									
End _____			Sky/Weather _____									
Forecast needed for:			Temperature _____									
<input type="radio"/> Today			Humidity _____									
<input type="radio"/> Tonight			20 ft Wind _____									
<input type="radio"/> Day 2			Valley _____									
<input type="radio"/> Extended			Ridge Top _____									
			Other (Specify in #23) _____									
24. Send Forecast to: ATTN:			25. Location:					26. Phone Number:		Fax Number:		
27. Remarks (Special requests, incident details, Smoke Dispersion elements needed, etc.):												

EXPLANATION OF SYMBOLS: † Use 24-hour clock to indicate time. Example: 10:15 p.m. = 2215; 10:15 a.m. = 1015 Indicate local standard time or local daylight time
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WS FORM D-1  
**WS FORM D-1, January 2005**

**INSTRUCTIONS:**

**I. Incident Personnel:**

1. Complete items 1 through 27 where applicable.

13. Weather Observations from project or nearby station(s):											
Place	Elevation	†Ob Time	20 ft. Wind		Eye Level Wind.		Temp.		Moisture		Remarks <i>(Relevant Weather, etc.)</i>
			Dir	Speed	Dir	Speed	Dry	Wet	RH	DP	
Unit G-50	1530'	0830	NW	6-8	NW	3-5	32		72		Observations from unit RAWS station, 50% cloud cover.

- a. Example of weather conditions on site:
  - b. If the incident (HAZMAT, SAR) involves marine, put the wave/swell height and direction in the Remarks section.
2. Transmit in numerical sequence or fax to the appropriate Weather Forecast Office. (A weather forecaster on duty will complete the special forecast as quickly as possible and transmit the forecast and outlook to you by the method requested)
  3. Retain completed copy for your records.
  4. **Provide feedback to NWS utilizing separate page.** Be sure to include a copy of the spot forecast with any feedback submission including forecaster's name. Feedback to NWS personnel is imperative to assist with future forecasts. Remember, feedback on correct forecasts is equally as valuable as feedback on incorrect forecasts! If spot forecast is significantly different than conditions on site, a second forecast may be required.

**II. ALL RELAY POINTS should use this form to insure completeness of date and forecast. A supply of this form should be kept by each dispatcher and all others who may be relaying requests for forecasts or relaying completed forecasts to field units.**

**III. Forms are available from your local National Weather Service Weather Forecast Office. They may also be reproduced by other agencies as needed, entering the phone number and radio identification if desired.**

***NOTICE: Information provided on this form may be used by the National Weather Service for official purposes in any way, including public release and publication in NWS products. False statements on this form may be subject to prosecution under the False Statement Accountability Act of 1996 (18 U.S.C. § 1001) or other statutes.***

## D. Haines Index Calculations

Computing the Haines Index in Middle Terrain Elevations:

Stability Term = Temp(850mb) - Temp(700mb)

Moisture Term = Temp(850mb) - Dew Point Temp(850mb)

Each term is given a value of either 1, 2 or 3.

Stability Term Value:

1 – if 5 deg C or less

2 – if 6-10 deg C

3 – if 11 deg C or more

Moisture Term Value:

1 – if 5 deg C or less

2 – if 6-12 deg C

3 – if 13 deg C or more

The Stability and Moisture terms are added to calculate the Haines index.

Mid Level Haines Index

Potential for large fire growth

2 or 3

...very low

4

...low

5

...moderate

6

...high

## E. Lightning Activity Level Guide

### Lightning Activity Level Guide

LAL	Coverage
1	No T-storms
2	Isolated T-storms (1-14% coverage)
3	Widely Scattered T-Storms (15-24% coverage)
4	Scattered T-storms (25-54% coverage)
5	Numerous (55+% coverage)
6	>=15% coverage...little or no rain

## F. Smoke Dispersal and Ventilation Terms

### Smoke Dispersal Terms

Category	Description
<b>Very Poor</b>	High smoke pollution potential. Usually occurs in a very stable air (strong inversion) and light winds. Normally occurs late at night and early in the morning hours, but could occur during the daytime when a shallow pool of cold air intrudes into the area creating strong low level inversions. Burning is not advised under this category.
<b>Poor</b>	Moderate to High smoke potential. Burning not advised under this category. Most likely time of occurrence is from evening through the early morning.
<b>Fair</b>	Marginal smoke pollution potential. Dependent on trend of weather and local conditions. Generally acceptable for small burns of dry fuels.
<b>Good</b>	Moderate to Low smoke pollution potential. No inversion and gentle winds expected. Most likely to occur in the late morning and afternoon when surface heating usually breaks through the low level inversions.
<b>Very Good</b>	Low smoke pollution potential. Transport winds or mixing height lower than that for Excellent. Transport winds stronger than that for Good. Most likely to occur in the late morning and afternoon.
<b>Excellent</b>	Low smoke pollution potential. Unstable airmass and/or brisk winds. Best time to conduct burning operations if fire can be controlled. Most likely to occur in the late morning and afternoon or when a strong weather system affects the area, eliminating all low level inversions and generating moderate winds.

### Breakdown of Ventilation

#### Based on Mixing Height and Transport Wind

Excellent.....	150,000 Knot Feet and Greater
Very Good.....	100,000 to 150,000 Knot Feet
Good.....	60,000 to 100,000 Knot Feet
Fair.....	40,000 to 60,000 Knot Feet
Poor.....	Less than 40,000 Knot Feet

## G. Listing of RAWS Stations in North Dakota

The following is a listing of active RAWS stations in North Dakota as of April 1<sup>st</sup>, 2008.

### NWS Bismarck Forecast Area

Crosby	320101	Watford City	321703
Painted Canyon	321704	Sand Creek	323804
Lostwood	320220	Knife River	322701
J. Clark Salyer	322901	Long Lake	322901
Arrowwood	323536		

### NWS Grand Forks Forecast Area

Hampden	320701	Devils Lake	321401
Sheyenne	324605	Tewaukon	325301

## VI. Agency Signatures

This plan is valid for the 2008 North Dakota fire season.

/Signed/date

Jim Meyer, NOAA National Weather Service Meteorologist in Charge (Bismarck)  
Representing both NWS offices with fire weather forecast responsibility in North Dakota  
3/31/08

/Signed/date

Maure Sand, Chair, North Dakota Fire Council  
3/31/08