2016

IOWA

FIRE WEATHER OPERATING PLAN

THIS OPERATING PLAN DETAILS SERVICES FROM THE FIVE NATIONAL WEATHER SERVICE OFFICES THAT SERVE THE STATE OF IOWA. THIS OPERATING PLAN WILL ESTABLISH FIRE WEATHER FORECASTS AND PROCEDURES REGARDING FIRE WEATHER IN GENERAL FOR THE STATE OF IOWA. FOR SPECIFIC FORECASTS AND PROCEDURES PERTAINING TO YOUR AREA, PLEASE VISIT THE WEBSITE OF THE SERVICING NWS OFFICE. FOR CONVENIENCE, APPENDIX G WILL HIGHLIGHT THESE DIFFERENCES.

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I. INTRODUCTION

The National Weather Service offices that serve Iowa partner with government agencies as well as the private sector to build a Weather Ready Nation. The National Weather Service and our partners have developed a fire weather program for the state of Iowa that includes an Annual Operating Plan (AOP). The National Weather Service will provide forecast and warning services aimed at providing decision support to fire management planning and control operations which lead to the effective prevention, suppression and management of state prairies, crop lands and wooded areas. This operating plan is intended to complement the Interagency Agreement for Meteorological Services.
Those agencies involved in the Interagency agreement with the National Weather Service are:
State Fire Marshall – Department of Public Safety
Iowa Department of Natural Resources
Army Corp. of Engineers,
Nature Conservancy,
Fish and Wildlife Service
National Park Service
Iowa Association of County Conservation Boards
NOAA National Weather Service (Davenport, Des Moines, LaCrosse, Omaha, Sioux Falls)

The Operating Plan is updated annually, and is reviewed by representatives of the NWS and each fire weather partner group 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 its field offices which require NWS forecasts.

A. SUMMARY OF CHANGES FOR 2016

1. New for this fall, there will be an agricultural fire threat map produced by WFO DMX during the fall harvest season, from September 15th through October 31st or until more than 90% of the crops have been harvested.
2. From local observations and a study done from WFO Wichita, NWS offices serving Iowa will experiment with using a GFDI value of 40 as guidance for the issuance of a Red Flag Warning. Guidance for the experimental period is set within the GFDI section.
3. Guidance has been established should adjustment of the GFDI be necessary.
4. We will be using the new google map based spot request form.

III. SERVICES PROVIDED BY THE NWS

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. Since there are no full-time forecasters devoted solely to fire weather, fire weather duties are scheduled among other warning and forecast responsibilities. **However, spot forecasts for wildfires are treated with a high priority.**

Fire weather forecasts will be prepared by the NWS for various fire control agencies in Iowa on a seasonal time schedule from early spring to late fall. Start-up and termination of the fire weather season is mainly related to weather conditions and as such will vary from NWS office to NWS office serving Iowa. In general, the season will run from March 1st through November 15th. History indicates spring to be the most active season for the fire weather user, since dead fuels are abundant and the relative humidity is sometimes quite low. In the fall, fires are more commonly related to cured/dry crops after a killing frost.

The NWS is responsible for routine and non-routine forecasts, which include the Fire Weather Planning Forecast (FWF), Spot forecasts for prescribed burning and wildfires (FWS), Rangeland Fire Danger Statements (RFD, by some offices), Fire Weather Watches, and Red Flag Warnings (RFW). Additionally, a state of Iowa map of the Grassland Fire Danger Index (GFDI) will be generated by WFO Des Moines and will include all counties in Iowa. Most of these products will be available on the Weather Information Management System (WIMS) and/or the internet web sites of the NWS and Eastern Area Coordination Center (EACC). The NWS web sites are listed in the Organizational Directory.

The web site for the EACC in the Great Lakes region is: http://gacc.nifc.gov/eacc/
Some additional fire weather forecasts that can be obtained on this web site are the weekly, monthly and seasonal **fire potential outlooks**. Fire weather agencies are encouraged to remain informed on these outlooks.

Table 1 below gives a general outline of forecast products and times. Offices may issue additional fire weather products based on their area of responsibility, which may include more than the state of Iowa. Figure 1 also indicates area of responsibility.

Table 1. Forecast times, product identifiers and area responsibility of NWS offices
Note: The morning planning forecast is issued throughout the entire fire season. The afternoon product is not issued from 6/1 through 8/31.

Office	Office Fire Weather Web Page	Planning Forecast by 7 AM and by 3:30 PM	Spot forecast on request	Rangeland Fire Danger Statement (not all offices)	Red Flag Warning	Fire Weather Watch
Des Moines	http://www.crh.noaa.gov/dmx/firewx.php	DSMFWFDMX	phone, web-based DSMFWSDMX		DSMRFWDMX	DSMRFWDMX
Omaha	http://www.crh.noaa.gov/oax/?n=oaxfirewx	OMAFWFOAX	phone, web-based OMAFWSOAX	OMARFDOAX	OMARFWOAX	OMARFWOAX
Sioux Falls	http://www.crh.noaa.gov/fsd/?n=firewx	FSDFWFFSD	phone, web-based FSDFWSFSD	FSDRFDFSD	FSDRFWFSD	FSDRFWFSD
La Crosse	http://www.crh.noaa.gov/arx/?n=firewx	MKEFWFARX	phone, web-based MKEFWSARX		MKERFWARX	MKERFWARX
Davenport	http://www.crh.noaa.gov/dvn/?n=fireweather	CHIFWFDVN	phone, web-based CHIFWSDVN		CHIRFWDVN	CHIRFWDVN

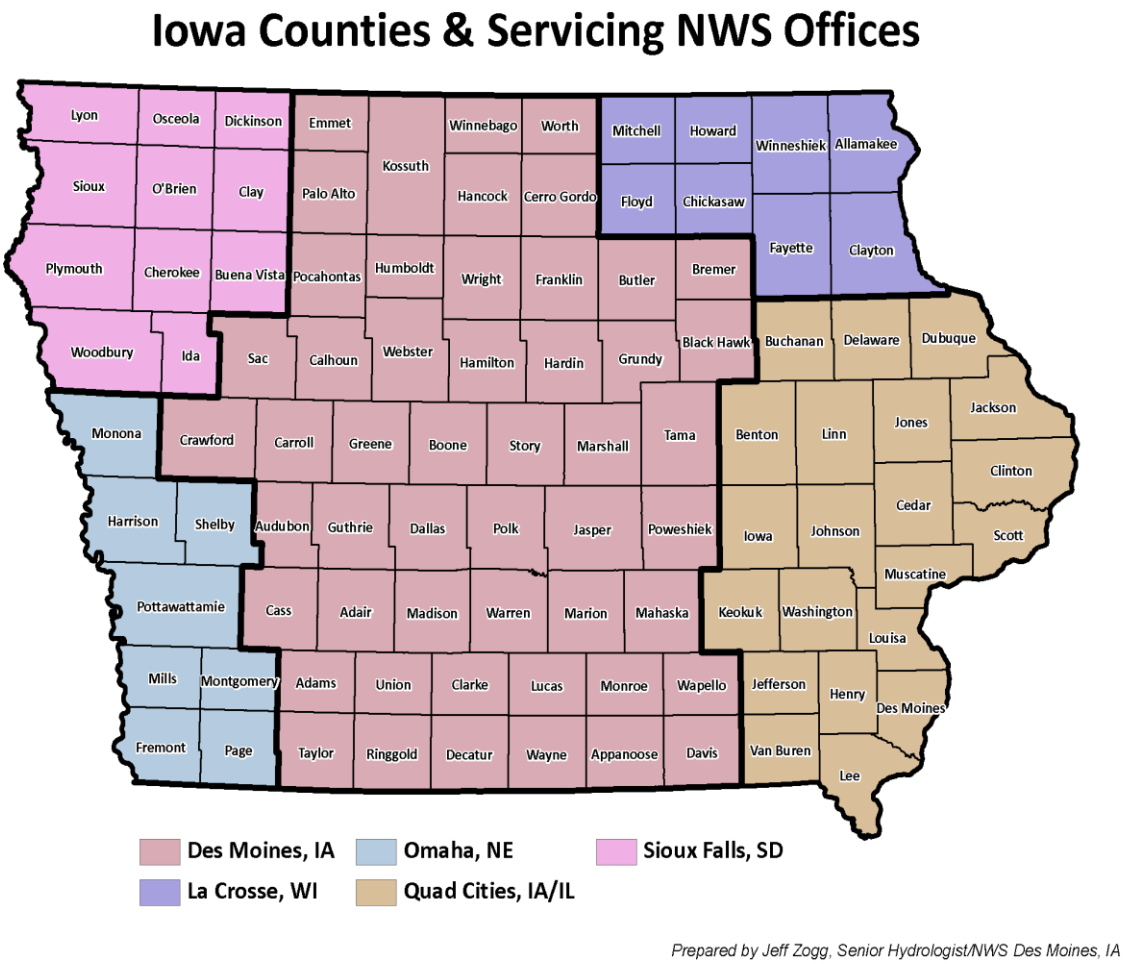

Figure 1. Forecast Areas

Products Issued:

1. Planning Forecasts
2. Spot Forecasts
3. Fire Weather Watch
4. Red Flag Warning
5. Rangeland Fire Danger Statement - Only Omaha and Sioux Falls
6. Grassland Fire Danger Map of Iowa – Des Moines only

B. Forecast and Warning Products

1. Routine Fire Weather Planning Forecasts

The Fire Weather Planning Forecast is a zone-type product. It should be used primarily for input in decision-making related to pre-suppression and other planning. The decisions impact firefighter safety, protection of the public and property, and resource allocation.

The morning and afternoon Fire Weather Planning Forecast may vary from office to office but will generally be broken down into a county forecast with a zone number assigned to each county. Some offices may combine counties to form one forecast group. The morning and afternoon forecast will be entered into the NWS AWIPS computer system by 700 AM LT and 330 PM LT respectively. They are then available to users via WIMS, NWS office web sites, or Predictive Services web sites at the GACCs.

The elements in the narrative forecast are:

Headline (Required for Red Flag Warnings and Fire Weather Watches)
- may also headline other significant weather concerns or changes

Discussion
- written with enough detail to give users knowledge of weather causes during the forecast period. Brief enough to make radio dissemination as efficient as possible (generally should not exceed 6 lines) 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 (Appendix F) 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 should be 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

- low level determined from the 950 - 850 MB level (about 1,000 ft to 5,000 ft.) However, over NWS Sioux Falls and NWS Omaha use the mid level Haines value taken from 850 – 700 mb.
- attached to "DAY" periods
- provided by all NWS offices year round

Smoke Management parameters
- depth of the mixing layer. The average mixing height from 12 to 18 hours local time.
- attached to "DAY" periods
- transport winds (speed and direction) in the mixing layer
- dispersion index consisting of a number and a text ranking of poor, fair, good, or excellent (Appendix B explains the terms used in smoke management)
- provided by all NWS offices year round

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

Precipitation amount
- coverage and expected amount

Grassland Fire Danger Index
- NOW FOUND IN A SEPARATE MAP ALL IT'S OWN

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

Examples of the morning and afternoon Fire Weather Planning Forecast are located on pages 12-14. The morning format includes the first three forecast periods, while the afternoon forecast will include an additional 4th period.

<u>Morning Planning Forecast Example: (Format and Forecast for example purposes only)</u>
Other office may have a tabular format for the first 36 hours.
 # GFDI value will not be included in LaCrosse's FWF product.

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FIRE WEATHER PLANNING FORECAST FOR IOWA
NATIONAL WEATHER SERVICE DES MOINES IA
413 AM CST WED NOV 16 2011

.DISCUSSION...
SURFACE HIGH PRESSURE WILL CONTINUE TO BUILD INTO THE REGION
WEDNESDAY. WINDS WILL BE FROM THE WEST TO NORTHWEST. LOCATIONS
IN THE NORTH COULD SEE SOME GUSTY WINDS LATE IN THE AFTERNOON.
CONDITIONS WILL REMAIN DRY.

IAZ004-171015-
EMMET-
INCLUDING THE CITIES OF...ESTHERVILLE
413 AM CST WED NOV 16 2011

                      TODAY        TONIGHT      THU

CLOUD COVER           PCLDY        MCLEAR       MCLEAR
PRECIP TYPE           FLURRIES     NONE         NONE
CHANCE PRECIP (%)     10           0            0
TEMP                  38           14           42
RH %                  28           72           33
20FTWND-AM(MPH)       W  9                      SW  7
20FTWND-PM(MPH)       W 11         W  9         SW 12
PRECIP AMOUNT         0.00         0.00         0.00
MIXING HGT(FT-AGL)    6800                      2500
TRANSPORT WND (MPH)   W 22                      SW 26
SMOKE DISPERSION      EXCELLENT                 GOOD
HAINES INDEX          4            4            4
#GFDI VALUE           LOW          LOW          LOW

.FRIDAY...PARTLY CLOUDY. LOWS IN THE LOWER 30S. HIGHS IN THE
LOWER 50S. SOUTH WIND 5 TO 15 MPH.
.SATURDAY...MOSTLY CLOUDY WITH A 50 PERCENT CHANCE OF RAIN
SHOWERS. LOWS IN THE MID 30S. HIGHS IN THE LOWER 40S. NORTHEAST
WIND UP TO 10 MPH.
.SUNDAY...MOSTLY CLOUDY. COLDER. LOWS AROUND 20. HIGHS IN THE
LOWER 30S. NORTHWEST WIND 5 TO 15 MPH.
.MONDAY...PARTLY CLOUDY. LOWS IN THE LOWER 20S. HIGHS IN THE
UPPER 30S. SOUTHWEST WIND AROUND 5 MPH.
.TUESDAY...MOSTLY CLEAR. LOWS IN THE MID 20S. HIGHS IN THE LOWER
40S. SOUTHWEST WIND 5 TO 10 MPH.

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IAZ006-171015-
WINNEBAGO-
INCLUDING THE CITIES OF...ALGONA
413 AM CST WED NOV 16 2011

                      TODAY        TONIGHT      THU
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CLOUD COVER           PCLDY        MCLEAR       MCLEAR
PRECIP TYPE           FLURRIES     NONE         NONE
CHANCE PRECIP (%)     10           0            0
TEMP                  38           15           42
RH %                  28           75           33
20FTWND-AM(MPH)       W  8                      SW  7
20FTWND-PM(MPH)       W 11         W  9         SW 12
PRECIP AMOUNT         0.00         0.00         0.00
MIXING HGT(FT-AGL)    6700                      2800
TRANSPORT WND (MPH)   W 24                      W 26
SMOKE DISPERSION      EXCELLENT                 GOOD
HAINES INDEX          4            4            4

.FRIDAY...PARTLY CLOUDY. LOWS IN THE LOWER 30S. HIGHS IN THE
LOWER 50S. SOUTH WIND 5 TO 15 MPH.
.SATURDAY...MOSTLY CLOUDY WITH CHANCE OF RAIN SHOWERS. LOWS IN
THE MID 30S. HIGHS IN THE UPPER 40S. SOUTH WIND UP TO 10 MPH.
.SUNDAY...MOSTLY CLOUDY. COLDER. LOWS IN THE LOWER 20S. HIGHS IN
THE LOWER 30S. NORTHWEST WIND 5 TO 15 MPH.
.MONDAY...PARTLY CLOUDY. LOWS IN THE LOWER 20S. HIGHS IN THE
UPPER 30S. SOUTHWEST WIND UP TO 5 MPH.
.TUESDAY...MOSTLY CLEAR. LOWS IN THE MID 20S. HIGHS IN THE LOWER
40S. SOUTHWEST WIND 5 TO 10 MPH.

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. . .(other zone groups and forecasts from the remainder of the NWS office's county area of responsibility).

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FORECASTER NAME, INITIALS or NUMBER

<u>The Afternoon Planning Forecast (example from LaCrosse): (Format and Forecast for example purposes only)</u>
Other office may have a tabular format for the first 36 hours.
 # GFDI value will not be included in LaCrosse's FWF product.

The afternoon planning forecast includes the same bulleted weather parameters as the morning planning forecast. The difference is a detailed, bulleted forecast is provided for the first four periods TONIGHT, TOMORROW, TOMORROW NIGHT and the NEXT DAY.

<u>Afternoon Planning Forecast Example:</u>
FIRE WEATHER PLANNING FORECAST FOR (name of area)
NATIONAL WEATHER SERVICE XXXXXXX
300 PM CDT THU MAY 25 2009

. . .HEADLINE OPTIONAL…

.DISCUSSION. . . A 6 LINE MAX TO DESCRIBE CONDITIONS.

#GFDI VALUES: TABLE DESCRIBING VALUES

XXZ032>034-041>044-261200-
ADAMS-BUFFALO-JACKSON-JUNEAU-LA CROSSE-MONROE-TREMPEALEAU-
INCLUDING THE CITIES OF...BLACK RIVER FALLS...LA CROSSE...MAUSTON...
SPARTA/TOMAH
300 PM CST THU MAY 25 2008

.TONIGHT. . .
SKY/WEATHER . . . . . PARTLY CLOUDY WITH SCATTERED SHOWERS AND
THUNDERSTORMS.
CHANCE OF RAIN 30 PERCENT.
MIN TEMPERATURE . . . . . 53 TO 59.
MAX HUMIDITY . . . . . .95 TO 100%.
20-FOOT WINDS . . . . . SOUTH WINDS 5 MPH.
PRECIPITATION . . . .SCATTERED TRACE TO .05 INCH.

.FRIDAY. . .
SKY/WEATHER . . . . . PARTLY CLOUDY UNTIL 1300. . .THEN MOSTLY SUNNY.
MAX TEMPERATURE . . . . . .80 TO 85.
MIN HUMIDITY . . . . . .35 TO 40%.
20-FOOT WINDS . . . . . SOUTH WINDS 5 TO 10 MPH.
HAINES INDEX . . . . . 4. . .LOW.
HOURS OF SUN . . . .9 HOURS.
PRECIPITATION . . . . . NONE.
MIXING HEIGHT . . . . . 2500 FT AGL (AVE. NOON-6PM)..**
TRANSPORT WINDS . . . . . SOUTH 25 MPH (AVE. NOON-6PM). .**
SMOKE DISPERSAL . . . . . .62500. . .EXCELLENT. (AVE. NOON-6PM). **

.FRIDAY NIGHT. . .
SKY/WEATHER . . . . . .MOSTLY CLEAR.
MIN TEMPERATURE . . . . . 45 TO 50.
MAX HUMIDITY . . . . . .72 TO 77%.
20-FOOT WINDS . . . . . SOUTH WINDS 5 TO 10 MPH.
PRECIPITATION . . . .NONE.

.SATURDAY. . .
SKY/WEATHER . . . . . MOSTLY SUNNY UNTIL 1000...THEN PARTLY CLOUDY.
MAX TEMPERATURE . . . . . .85 TO 90.
MIN HUMIDITY . . . . . .35 TO 40%.
20-FOOT WINDS . . . . . SOUTH WINDS 10 TO 15 MPH.
HAINES INDEX . . . . . 6. . .HIGH.
HOURS OF SUN . . . . . 7 HOURS.
PRECIPITATION . . . . . NONE.
MIXING HEIGHT . . . . . 1500 FT AGL (AVE. NOON-6PM).**
TRANSPORT WINDS . . . . . SOUTH 25 MPH (AVE. NOON-6PM).**
SMOKE DISPERSAL . . . . . .37500. . .GOOD. (AVE. NOON-6PM).**
#GFDI VALUES……..15

.FORECAST DAYS 3 THROUGH 7...
.SATURDAY NIGHT…PARTLY CLOUDY. LOWS NEAR 70. SOUTH WINDS 10 TO 15 MPH.
.SUNDAY. . .PARTLY CLOUDY. BREEZY. CHANCE OF RAIN SHOWERS IN THE AFTERNOON.
HIGHS IN THE MID 80S. SOUTH WINDS 15 TO 20 MPH. CHANCE OF RAIN SHOWERS 30 PERCENT.
.SUNDAY NIGHT…PARTLY CLOUDY. LOWS IN THE LOWER 50S. NORTHEAST WINDS 5 TO 10 MPH.
.MONDAY. . .MOSTLY CLOUDY. BREEZY. CHANCE OF SHOWERS AND THUNDERSTORMS. HIGHS

IN THE MID 70S. SOUTHEAST WINDS 20 TO 25 MPH. CHANCE OF RAIN 50 PERCENT.
.MONDAY NIGHT…CLOUDY. CHANCE OF SHOWERS AND THUNDERSTORMS. LOWS IN THE MID 50S.
SOUTH WINDS 10 TO 15 MPH. CHANCE OF RAIN 50 PERCENT.
.TUESDAY. . .CLOUDY. SHOWERS AND THUNDERSTORMS LIKELY. HIGHS IN THE LOWER 70S.
SOUTH WINDS 10 TO 15 MPH. CHANCE OF RAIN 70 PERCENT.
.TUESDAY NIGHT…PARTLY CLOUDY. LOWS IN THE LOWER 50S. WEST WINDS 5 TO 10 MPH.
.WEDNESDAY. . .PARTLY CLOUDY. HIGHS IN THE MID 60S. NORTHWEST WINDS 10 TO 15 MPH.
.WEDNESDAY NIGHT…CLEAR. LOWS IN THE MID 40S. NORTH WINDS 5 TO 10 MPH.
.THURSDAY. . .PARTLY CLOUDY. HIGHS IN THE MID 70S. SOUTH WINDS 10 TO 15 MPH.

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. . .(other zone groups and forecasts from the remainder of the NWS office's county area of responsibility).

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FORECASTER NAME, INITIALS or NUMBER
***-These smoke management elements are now provided year round.*
- *This value will not appear in WFO LACROSSE's product.*

a) Updates to Fire Weather Planning Forecasts (may vary from office to office)

Updates and a reason for the update will be provided whenever forecast conditions become unrepresentative. Updates to a Fire Weather Planning Forecast will be required for the morning and afternoon forecast packages and if a Fire Weather Watch or Red Flag Warning is issued. Fire agencies are also encouraged to call their local NWS office when the forecast is unrepresentative.

2. 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 person requesting the spot forecast to indicate that the request is for wildfire suppression. Spot requests for prescribed burns may be required the evening before a burn by some offices.

By Interagency Agreement (NWSI 10-406), the NWS will provide spot forecasts to any federal, state, tribal, or local official for support of a wildfire.

For non-wildfire purposes, resources permitting, the NWS 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 for Meteorological Services.
c. Upon request of any public safety official who represents that the spot forecast is essential to public safety, e.g. due to the proximity of population centers or critical infrastructure, essential to protect incident responders, and/or essential to protect vital resources. 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.
d. In support of Homeland Security Presidential Directive #5 (HSPD 5).
http://training.fema.gov/EMIWeb/IS/ICSResource/assets/HSPD-5.pdf

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

Customer Identification - The person requesting the 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 or be sent to the NWS office before the burn begins and again mid-burn. If the request is sent in the night before then an observation should be sent when on site and before ignition. 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 (provide a mid-burn observation). Land management personnel should contact the servicing NWS office if forecast conditions appear unrepresentative of actual weather conditions. Spot forecasts should be considered one-time requests, and are not routinely updated unless representative observations are available to the forecaster. Feedback from land management personnel is also encouraged during or after the burn using the "please provide feedback" section of the online spot forecast.

Users are asked to read the Fire Weather Planning Forecast before making a spot forecast request. The online Activity Planner found on the left hand menu of each forecast office (ex. http://forecast.weather.gov/wxplanner.php?site=dmx) is also a useful tool to help identify prescription windows. However, the Fire Weather Planning Forecast and Activity Planner are only meant as guides and not intended to replace to a formal, official spot forecast. To hold the number of spot forecasts to a manageable level, internal coordination and planning should be done by partner agencies making forecast requests.

b) Content and Format - The standard format for wildfire spots includes: headlines (Red Flag Warning or Fire Weather Watch) explaining what, when, where and why; discussion, sky/weather, temperature, relative humidity, and wind. Other 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 customer. Users should be as specific as possible when making a forecast request.

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. A phone call must accompany the 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. A representative weather observation should accompany the request. As indicated above in section 3a, information justifying the spot forecast request must also be provided for the forecast request to be honored.

SPOT FORECAST FOR DOGLETG...USFWS
NATIONAL WEATHER SERVICE DES MOINES IA
449 AM CST WED JAN 11 2012

FORECAST IS BASED ON IGNITION TIME OF 0930 CST ON JANUARY 11.
IF CONDITIONS BECOME UNREPRESENTATIVE...CONTACT THE NATIONAL WEATHER SERVICE.

PLEASE REMEMBER TO SUBMIT A MID BURN OBSERVATION TO THE NATIONAL WEATHER SERVICE FOR EACH PRESCRIBED BURN.

.DISCUSSION...
A STRONG COLD FRONT WILL PUSH ACROSS THE STATE TODAY AND WILL PROVIDE VERY GUSTY NORTHWEST WINDS AND CHANCES OF LIGHT SNOW BY THIS AFTERNOON. THE TIMING OF THE COLD FRONT LOOKS TO BE BETWEEN 11 AM TO 1 PM CST TODAY FOR THE FORECAST AREA WITH AN ABRUPT SHIFT IN WINDS TO THE NORTHWEST. LIKELY TO SEE SOME GUSTS TO NEAR 45 MPH BY THE LATE AFTERNOON HOURS.

.TODAY...

SKY/WEATHER.....MOSTLY SUNNY (35-45 PERCENT) THEN BECOMING MOSTLY CLOUDY (80-90 PERCENT). CHANCE OF SNOW LATE IN THE AFTERNOON.
TEMPERATURE.....39 AT IGNITION...MAX 45.
RH.....72 PERCENT AT IGNITION...MIN 60 PERCENT.
EYE LEVEL WINDS...BREEZY. NORTHWEST WINDS 5 TO 13 MPH INCREASING TO 24 TO 25 MPH.
HAINES INDEX…….....4 OR LOW POTENTIAL FOR LARGE PLUME DOMINATED FIRE GROWTH.
MIXING HEIGHT.....2100 FT AGL INCREASING TO 2700 FT AGL LATE IN THE AFTERNOON.
MIXING WINDS.....NORTHWEST 1 TO 10 MPH INCREASING TO NORTH 26 TO 35 MPH.
SMOKE DISPERSAL....FAIR (48600 KNOT-FT) INCREASING TO GOOD (82900 KNOT-FT) LATE IN THE AFTERNOON.
WIND (20 FT).....WINDS WEST AT 9 MPH AT IGNITION...OTHERWISE BREEZY. NORTHWEST WINDS 5 TO 13 MPH INCREASING TO 24 TO 25 MPH.

TIME (CST)	9AM	10A	11A	12P	1PM	2PM	3PM	4PM	5PM
SKY (%).....	36	41	51	56	62	74	80	84	92
WEATHER COV.....							CHC	CHC	CHC
WEATHER TYPE....							SN	SN	SN
TSTM COV.....									
TEMP.....	36	39	41	44	42	39	37	34	32
RH.....	72	67	65	60	62	67	70	72	72
20 FT WND DIR..	W	W	NW	NW	NW	NW	NW	NW	NW
20 FT WND SPD..	7	9	13	15	18	22	25	24	24
20 FT WND GST.	10	15	20	20	25	30	30	30	35
EYE LVL WND DIR.	W	W	NW	NW	NW	NW	NW	NW	NW
EYE LVL WND SPD.	5	6	9	11	13	16	18	17	17
EYE LVL WND GST.	10	15	20	20	25	30	30	30	35
MIX HGT (KFT).....	0.3	0.7	1.1	1.5	1.8	2.1	2.5	2.6	2.7
MIXNG WND DIR..	SW	W	NW	N	N	N	N	N	N
MIXNG WND SPD….	1	5	10	16	21	26	30	33	35
HAINES INDEX.....	4	4	4	4	3	3	2	2	2

$$
FORECASTER...XXXXXXX
REQUESTED BY...XXXXXXX
TYPE OF REQUEST...PRESCRIBED
.TAG 20120111.DOGLE.01/DMX

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

3. Fire Weather Watches and Red Flag Warnings

NWS offices that serve Iowa will issue Fire Weather Watches and Red Flag Warnings when the combination of dry fuels and weather conditions support very high and/or extreme fire danger. Each office will contact their sources for fuel conditions and must be aware of fuel conditions that could lead to very high and/or extreme fire danger. The NWS must have knowledge of fuel conditions before issuing Fire Weather Watches and Red Flag Warnings.

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

The issuance of these products is typically (but not always) a two-stage process.

a. Fire Weather Watch

A Fire Weather Watch may be issued when there is a reasonable level of confidence for the development of a red flag event. This purpose of the watch is to alert partners at least a day in advance for purposes of resource allocation and fire fighter safety. A watch will typically be issued 24 to 48 hours in advance of the expected onset of criteria. Some offices may issue a watch 12 to 72 hours in advance of the expected onset of criteria. Red flag criteria are listed below. All of the following weather conditions, including the dryness of the fuels, must be anticipated for a watch to be issued. Please remember that these criteria are subjective guidelines.

1. Sustained ten-minute winds at the 20 foot level are at or above 25 mph.
2. Minimum relative humidity at or less than 25 percent.
3. The dryness of the fuels will also be a consideration. Each office will have the flexibility to determine the dryness of fuels. This can be done by looking at the Energy Release Component (ERC - NFDRS output), the DNR and, if necessary, the USFS, can provide this information to the NWS. See the call list (under section 4. C. - Procedures) to determine who the NWS should contact for this information.

Other factors which may be considered if any of the above are marginal:

- The surface dew point depression (best indicator of high fire danger) is more than 40 F.
- The 850 mb dew point depression is greater than 18F (10C).
- It is before spring green-up (usually by June 1st).
- It is after the fall color change or a killing frost.
- The area has been in a dry spell for a week or more.
- Dry lightning is anticipated (rare, except during periods of drought)
- Gusty winds in excess of 50 mph (can result in trees falling on power lines, causing power lines to break and sparking fires) are expected.

- NFDRS values are in the high to extreme categories.
- 10-hour fuel moisture is less than 10%
- Extreme behavior on prescribed burns in the area the past several days.
- Haines Index values are in the moderate to high category (5 or 6)

The most common red flag or near red flag synoptic weather situations:

- Strong low pressure moving from the north or central U.S. Rockies to Lake Superior, or a strong Alberta Low tracking to near Lake Superior. Both situations require a windy dry slot associated with a low level jet.
- A departing Hudson Bay High Pressure replaced by the strong low pressure scenario. The high pressure area provides portions of the Upper Midwest with dry Easterly winds and subsiding air. This will effectively dry out the fuels.

Fire Weather Watch coordination and issuance:

- NWS offices will coordinate the issuance, change, and cancellation of Fire Weather Watches with each other.

- NWS offices will coordinate weather conditions internally via chat software or telephone.

- Some NWS offices are also required to coordinate between other agencies as well. Please become familiar with the actual requirements for the county with which you are burning in.

- The NWS contact person for each forecast area shall be responsible for assuring that this information is known to all offices that serve the state of Iowa via chat software or telephone.

- During situations of borderline criteria for a Red Flag Warning (or when a Fire Weather Watch is in effect), the NWS is encouraged to use terminology such as “severe fire weather conditions may occur…” or “critical fire weather conditions may be met”. These terms may be used in the discussion section of the Fire Weather Watch and Fire Weather Planning Forecast.

- A Fire Weather Watch **will be** disseminated on NOAA All Hazards Radio by broadcasting the actual RFW product.

- A Fire Weather Watch will be headlined in the Fire Weather Planning Forecast. The headline will include what (ex. A Fire Weather Watch has been issued), when (ex. until 7 PM), where (ex. for a portion of Northern Iowa) and why (ex. for potentially extreme fire weather conditions). Headlines belong before the discussion and before each zone grouping of the Fire Weather Planning Forecast. Headlines will also go into the SFP product. The RFW

will also be referenced in the HWO (Hazardous Weather Outlook Product).

- If issued, a Fire Weather Watch (RFW) will describe the affected area, valid time of the watch, and reasons for the watch. A RFW shall have a UGC coding line followed by a Valid Time Event Code (VTEC).

- Some offices will be issuing a You Tube video whenever a fire weather watch is issued. These you tube videos will vary office by office and may be pre-recorded or they may be made new with each issuance. These should be played while the watch is in effect and should be linked to the issuing offices web page. Linking the video to the decision support page is encouraged.

Updates:

Updates to the Fire Weather Watch should be done every 6 hours after the gridded forecast has been updated.

WWUS83 KDMX 160518
RFWDMX

URGENT - FIRE WEATHER MESSAGE
NATIONAL WEATHER SERVICE DES MOINES IA
345 AM CDT WED FEB 15 2012

...CRITICAL FIRE WEATHER CONDITIONS POSSIBLE THURSDAY MORNING THROUGH FRIDAY AFTERNOON…

.A STRONG WEST WIND AND LOW RELATIVE HUMIDITY IS POSSIBLE TO OCCUR BEGINNING THURSDAY WHICH COULD LEAD TO CRITICAL FIRE CONDITIONS. GRASSES...BRUSH AND CROPS ARE VERY DRY ACROSS THE REGION AND FIRES COULD SPREAD QUICKLY UNDER THESE CONDITIONS.

IAZ050-061-062-073>075-083>086-094>097-161330-
/O.NEW.KDMX.FW.A.0001.120216T1200Z-120218T0000Z/
TAMA-JASPER-POWESHIEK-WARREN-MARION-MAHASKA-CLARKE-LUCAS-MONROE-WAPELLO-DECATUR-WAYNE-APPANOOSE-DAVIS-
345 AM CDT WED FEB 15 2012

...FIRE WEATHER WATCH IN EFFECT FROM THURSDAY MORNING THROUGH FRIDAY AFTERNOON…

THE NATIONAL WEATHER SERVICE IN DES MOINES HAS ISSUED A FIRE WEATHER WATCH WHICH IS IN EFFECT FROM THURSDAY MORNING THROUGH FRIDAY AFTERNOON.

* TIMING…THE WIND IS FORECAST TO INCREASE ACROSS THE AREA THRURSDAY MORNING AND REMAIN BRISK THROUGH FRIDAY AFTERNOON. THIS COMBINED WITH DRY AIR MOVING IN IS EXPECTED TO DRY FUELS IN THE AREA SIGNFICANTLY BY THURSDAY AFTERNOON.

* WIND…A WEST WIND IS FORECAST TO INCREASE TO 25 TO 35 MPH.

* RELATIVE HUMIDITY IS EXPECTED TO BOTTOM OUT AROUND 20 PERCENT.

* FUEL CONDITION…FUELS ACROSS THE AREA ARE CURRENTLY 70 TO 80 PERCENT CURED.

* IMPACTS…FIRES COULD START AND SPREAD VERY EASILY.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A FIRE WEATHER WATCH MEANS THAT CRITICAL FIRE WEATHER CONDITIONS MAY OCCUR. LISTEN FOR LATER FORECASTS AND A POSSIBLE RED FLAG WARNING. FOR MORE INFORMATION VISIT HTTP://WEATHER.GOV/DMX (ALL LOWER CASE).

&&
$$

FORECASTER NAME

Figure 3. Example of a Fire Weather Watch.

b. Red Flag Warnings

A Red Flag Warning is issued when there is reasonably high confidence that wind speeds greater than 25 mph and relative humidity values of 25 % or less are imminent or will be met within 24 hours and fuels are sufficiently dried to produce a very high or extreme fire danger potential. However, a Red Flag Warning can be issued any time at the request of fire management personnel during times of critically dry fuels.

The National Weather Service will monitor meteorological conditions and should obtain fuel condition from whatever means is best for their area of responsibility. A Red Flag Warning will be issued immediately when red flag conditions are occurring, but, depending on the office, may be coordinated prior to issuance with user agencies. The NWS may also monitor the Energy Release Component (ERC) by going to the DNR or Eastern Area Coordination Center (EACC) Internet site. These sites will help the NWS monitor the dryness of the fuels in the state.

Red Flag Warning coordination and issuance:

- NWS offices will use the HWO product to convey the threat for very high or extreme fire danger. This will be done in addition to the RFW product.

- NWS offices will coordinate the issuance, change and cancellation for Red Flag Warnings with each other. Customers are encouraged to review each offices requirements for the counties they plan to burn in. For offices that must coordinate with the DNR or the USFS, if they observe wet fuels and do not believe a warning should be issued, then do not issue the warning.

- If a Fire Weather Watch has already been issued for the affected area (i.e. fuel coordination has already taken place), and if forecast offices agree that critical fire weather conditions will be met, a Red Flag Warning can be issued **without any additional coordination** with the fire management agencies (i.e. DNR and USFS).

- For **very high confidence** Red Flag Warning events, the Red Flag Warning should be issued **the afternoon before** instead of the morning of the event. This would allow extra lead time for the fire management agencies to plan for these events.

- A Red Flag Warning **may be** disseminated on NOAA All Hazards Radio and also NAWAS (WFO FSD will not issue the Red Flag Warning on the NOAA All Hazards Radio).

- A Red Flag Warning will be headlined in the routine Fire Weather Planning Forecast (FWF) and the State Forecast Product. The headline should include what, when, where and why. Headlines belong before the discussion and before each zone grouping of the Fire Weather Planning Forecast. The RFW should be referenced in the Hazardous Weather Outlook

product should also contain information about the RFW.

- A Red Flag Warning shall the issues for areas greater than 3 counties that are in the very high or extreme categories on the GFDI map. Areas smaller than 3 counties should are left to forecaster discretion and should be coordinated if they cross or align with CWA borders.

- Some offices serving Iowa will be issuing a You Tube video whenever a red flag warning is issued. These you tube videos will vary office by office and may be pre-recorded or they may be made new with each issuance. These should be played while the watch is in effect and should be linked to the issuing offices web page. Linking the video to the decision support page is encouraged.

- If issued, a Red Flag Warning (RFW) should describe the affected area, valid time of the warning, and reasons for warning. A RFW shall have a UGC coding line followed by a Valid Time Event Code (VTEC).

Cancellation of Fire Weather Watches and Red Flag Warnings:

When conditions warrant that a Fire Weather Watch or Red Flag Warning is no longer needed, it should be cancelled by the NWS as soon as possible. **Note: A cancellation statement is not needed if upgrading from a watch to a warning, or for a Red Flag Warning that is being allowed to expire.**

1. The cancellation should be coordinated with NWS offices serving Iowa.
2. The headline in the Fire Weather Planning Forecast will be removed.
3. A cancellation statement under the RFW message should be issued. A RFW shall have a UGC coding line followed by a Valid Time Event Code (VTEC).

**** Updates to red flag warnings:**

Updates will be every 6 hours after the forecast grids have been updated or if changes are needed in the Red Flag headlines which include:

1. New issuance of a Fire Weather Watch or Red Flag Warning.
2. Upgrading from a Fire Weather Watch to a Red Flag Warning.
3. Change an area outline of a Fire Weather Watch or Red Flag Warning.
4. Cancellation of a Fire Weather Watch or Red Flag Warning.

In addition, updates to the Red Flag Warning should be made with each updated forecast issuance and may be made anytime at lead forecaster discretion. Situations for an update may include when the following conditions** are met:

1. Precipitation occurrence or non-occurrence if different from the forecast.

2. Wind speed differs by more than 10 mph from the forecast.
3. Temperature differs by more than 5 degrees Fahrenheit from the forecast.
4. Relative Humidity differs by 10 % or more from the forecast.

** Exact criteria may vary slightly between NWS forecast offices.
NWS Des Moines will be responsible for updating the SFP product headline.

c. Procedures for potential RFW situations.

- For conditions that are expected to approach but do not meet RFW criteria where forecaster confidence is low, the NWS will attempt to provide Iowa partners with a "heads-up" of potentially critical fire weather conditions up to 48 hours in advance if possible. **The most common method will be a mention in the HWO (Hazardous Weather Outlook) product** but this can also be discussed in the NWS chat service**.**

- After an initial mention of fire danger potential, partners should turn their attention to NWS webpages for further information on fire danger conditions. Fire weather partners are encouraged to be in NWS chat rooms for information on forecast conditions and to provide input. Coordination of an RFW product will only occur between NWS offices serving Iowa. Partners will need to pay attention to the NWS websites for their area for the issuance of a Fire Weather Watch or Red Flag Warning. Partners can have access to NWS chat rooms, including eacceastfirechat, after signing up for NWS chat at the following website: https://nwschat.weather.gov/

- A Fire Weather Watch may be issued for affected areas after NWS forecast offices coordinate and agree that critical fire weather conditions will be met, or if forecaster confidence is growing.

WWUS83 KDMX 160518
RFWDMX

URGENT - FIRE WEATHER MESSAGE
NATIONAL WEATHER SERVICE DES MOINES IA
345 AM CDT WED FEB 15 2012

...CRITICAL FIRE WEATHER CONDITIONS WILL EXIST THURSDAY MORNING THROUGH FRIDAY AFTERNOON…

.A STRONG WEST WIND AND LOW RELATIVE HUMIDITY WILL OCCUR THURSDAY WHICH COULD LEAD TO CRITICAL FIRE CONDITIONS. GRASSES...BRUSH AND CROPS ARE VERY DRY ACROSS THE REGION AND FIRES COULD SPREAD QUICKLY UNDER THESE CONDITIONS. THESE CONDITIONS WILL LAST THROUGH FRIDAY AFTERNOON

IAZ050-061-062-073>075-083>086-094>097-161330-
/O.NEW.KDMX.FW.A.0001.120216T1200Z-120218T0000Z/
TAMA-JASPER-POWESHIEK-WARREN-MARION-MAHASKA-CLARKE-LUCAS-MONROE-WAPELLO-DECATUR-WAYNE-APPANOOSE-DAVIS-
345 AM CDT WED FEB 15 2012

...RED FLAG WARNING IN EFFECT FROM 6 AM CST THURSDAY MORNING THROUGH 6 PM CST FRIDAY AFTERNOON…

THE NATIONAL WEATHER SERVICE IN DES MOINES HAS ISSUED A RED FLAG WARNING WHICH IS IN EFFECT FROM 6SM CST THURSDAY MORNING THROUGH 6 PM CST FRIDAY AFTERNOON.

* SHORT TERM TRENDS…A WEST WIND WILL INCREASE TO 25 MPH BY 11 AM WITH GUSTS TO 35 MPH IN THE AFTERNOON AND AGAIN FRIDAY. THE WIND WILL STILL BE BRISK OVERNIGHT BUT NOT BE AS GUSTY. CRITICAL FIRE CONDITIONS WILL PEAK BY 2 PM BOTH AFTERNOONS.

* WIND…WEST WIND AT 25 TO 35 MPH.

* RELATIVE HUMIDITY IS EXPECTED TO REACH A MINIMUM OF 20 PERCENT.

* FUEL CONDITION…FUELS ACROSS THE AREA ARE CURRENTLY 70 TO 80 PERCENT CURED. THE GRASSLAND FIRE DANGER INDEX WILL REACH VERY HIGH BY 10 AM THURSDAY AND EXTREME BY 1 PM THURSDAY.

* IMPACTS…THE EXTREMELY DRY AND WINDY CONDITIONS WILL CREATE EXTREME FIRE CONDITIONS. EMBERS CAN BE CARRIEDIN THE WIND TO START NEW FIRES. FIRES COULD START AND SPREAD VERY EASILY.

PRECAUTIONARY/PREPAREDNESS ACTIONS...

A RED FLAG WARNING MEANS THAT CRITICAL FIRE WEATHER CONDITIONS ARE OCCURRING NOW OR WILL BE SHORTLY. STRONG WIND AND LOW RELATIVE HUMIDITY WILL CREATE EXPLOSIVE FIRE GROWTH POTENTIAL. LISTEN FOR LATER FORECASTS AND A POSSIBLE RED FLAG WARNING. FOR MORE INFORMATION VISIT HTTP://WEATHER.GOV/DMX (ALL LOWER CASE).

&&
$$
FORECASTER NAME

Figure 4. Example of a Red Flag Warning.

4. Grassland Fire Danger Map for Iowa

The Grassland Fire Danger Index is a numerical value that indicates the potential for grassland fires to experience extreme fire behavior, which in turn, can lead to a potential threat to life and property. The GFDI accounts for the curing of the fuel (grasses), temperature, relative humidity and the average sustained wind. It had been noticed that GFDI very high and extreme values were in need of refinement for the upper Midwest. Through a study done by WFO Wichita and through local observations, findings showed that extreme conditions that warranted Red Flag Warning tended to occur with a GFDI value closer to 40. In an attempt to refine the GFDI rating system closer to values that fit this region, the NWS office serving Iowa shall, for 2016, experiment with using values of this index that will range as follows: from 0-2 for low, 3-7 for moderate, 8-19 for high, 20-39 for very high and 40 or more for extreme. Since the ranges for very high and extreme are in experimental mode for this season, collaboration must occur when the GFDI are in these ranges and a decision will be made as to whether a Red Flag Warning will be issued or not. If a Red Flag Warning will not be issued with a GFDI value of 40, then WFO DMX will adjust the range back to the official values in the program used to create the GFDI map to avoid painting the GFDI map with extreme when no warning product will be issued.

As in the past, there will only be one value assigned for the entire county, which will be the average of maximum values at each point over a 12 hour period of the Grassland Fire Danger Index for that county. The reason for only one value is to avoid confusion for the customer should more than one value occur for the county. The color scheme for the GFDI map will be similar to that of the U.S. Fire Danger System for which those in the fire weather community are already familiar with. The categories for the GFDI are low, moderate, high, very high and extreme. The colors assigned to each category are as follows: low shall be green, moderate shall be blue, high shall be yellow, very high shall be orange and extreme shall be red. Blue is chosen for moderate to avoid confusion with color shading.

The purpose of this product is to provide the public, the fire weather community and local government agencies in charge of fire safety with a quick view of the risk of grassland fire danger. The customer should then take appropriate action for the risk at hand, including further investigation in the event of any category of high or above. This product is NOT intended to be a sole source for assessing the fire danger for the day. The NWS provides other products to aid in that assessment and those should be utilized as well.

The creation of the GFDI map for Iowa shall be the responsibility of WFO Des Moines. The product will then be placed on the internet, in the location of the WFO Fire Weather page. Surrounding WFO offices can create a link to that page so that the GFDI map for Iowa can be displayed on their web pages. A value of extreme for an area of more than 4 counties shall cause action to be taken by the NWS office(s) involved. As always, forecaster discretion shall be used in any situation but when an area of 4 counties or

more are exhibiting extreme fire danger, additional action by the NWS shall be required. The action taken shall be that a Red Flag Warning shall be issued for that area as well as the inclusion of a headline in the "In The News" section of the NWS offices web page. The posting of the GFDI map on social media is suggested as well. If the 4 county area crosses CWA boundaries then collaboration must occur between the offices involved. If, in a forecasters (collaborative) judgment the situation may not warrant a Red Flag Warning, then minimally a statement should be issued expressing an elevated fire danger with a potential for a Red Flag Warning. Reference to the GFDI value for Iowa products will be removed from other products and sources and found on the GFDI map.

During the fall harvest season, WFO DMX shall have the additional responsibility of producing an agricultural fire threat map. The dates that this map will be produced shall be tied to harvest, beginning at the time the first crops are being harvested and ending when more than 90 percent of the crops have been harvested. The production of the map will rely on all NWS offices serving Iowa to have ag curing grids in GFE which will be retrieved from DMX and used in the production of the ag fire threat map. The process that each WFO shall follow will be the process that WFO DVN, who developed this procedure. The ag fire threat map shall be produced in the morning, alongside the GFDI map. Other NWS offices serving Iowa shall link the map to their page.

One of the expected benefits of lowering the GFDI to 40 in this experimental phase is that we will no longer have to artificially raise the GFDI to values of 50 or more to have extreme values in for a Red Flag Warning. However on rare instances when adjusting the GFDI may be required, the following guidelines shall be used. When the GFDI must be adjusted to reflect the forecasters thinking and judgement in a particular situation, changes must be collaborated with surrounding offices and the adjusting of the GFDI should be reached by manually adjusting temperature, dewpoint, relative humidity and wind grids to bring the GFDI values as close what the forecaster is thinking as possible. Manual manipulation should ONLY be done on the rare occasion when a judgement call is being made by the forecaster regarding a warning product. The outcome of this experimental period should be to reduce the number of times this happens and to have to science better reflect the fire threat for the upper Midwest.

5. Verification and Participation in Interagency Groups

1. Verification

Fire weather program leaders will verify the red flag program according to GPRA goals that are set nationally. For 2016 the POD (Probability of Detection) of .89 and a lead time of 10.55 hours are the verification goals. Guidelines are as follows: 1) An RFW issued for multiple areas (defined as counties or fire weather zones) will be considered an individual RFW for as many areas issued (ex. an RFW for 20 counties or fire weather zones = 20 RFW's

issued). 2) A representative observation for each zone will be chosen from an AWOS, ASOS or RAWS site within the county or zone and deemed accurate. If these systems are sparse within an area, then a nearby AWOS, ASOS or RAWS site may be used to verify a surrounding area. 3) An RFW will count as verified when a- fuels are verified to be in a condition to burn, b- criteria is met and must persist for a 3 hour c- In addition to sustained winds, wind gusts over 30 mph will count as a verification. 4) When possible, search for stories of fires in your area of responsibility on the day in question.

If possible, a discussion between focal points should take place for adjoining areas where criteria is close or questionable. Missed events will be counted as those areas that do not meet criteria when an RFW is issued. On days where an RFW is not issued but wind is expected to be advisory criteria or higher, a check of relative humidity across the forecast area and a check that fuels are in a condition to burn will be conducted by the fire weather focal point, their assistants or as deemed by the shift supervisor. If fuels are in a condition to burn and observations show criteria are met OR multiple fires are reported, then a missed event will be counted.

2. Participation in Interagency Groups

NWS offices providing fire weather services for Iowa 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 partners. It also provides an effective vehicle for discussions pertaining to changes to the Annual Operating Plan. Minimally, this meeting should take place each January or February via a join.me meeting or any other electronic format.

5. Special Services

The NWS provides a group of trained Incident Meteorologists (IMETs) who will provide on-site forecasting when requested by land management agencies. Certified IMETs are located in Minneapolis/Chanhassen and Duluth, MN and in Marquette, MI. Contact the appropriate dispatch for information regarding IMET orders.
In addition to wildfires, IMETs may be dispatched to support:

- Large critical resource value prescribed burns.
- 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.

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 will arrive at the Incident with an All Hazard Meteorological Response System (AMRS). The AMRS is used to provide a mobile platform for data collection and forecast preparation.

3) 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. An ATMU will be cached at the Twin Cities/Chanhassen NWS office.

4) IMET data needs will be obtained by one of three 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).

5) The NWS is responsible for assembly and operation of this equipment, calibration of instruments, ordering contract repair, and, if necessary, scheduling training sessions.

6) Request and dispatch of IMETs and equipment is accomplished through the National Resource Coordination System. If the IMETs in Minneapolis, Duluth or Marquette are unavailable, the request will 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.

7) 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.

8) 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. Reimbursement includes 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.

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

IV. WILDLAND FIRE AGENCY SERVICES AND RESPONSIBILITIES

A. OPERATIONAL SUPPORT AND PREDICTIVE SERVICES - the Eastern Area Fire Weather Program Manager/meteorologist (currently Steve Marien), working remotely for the EACC in St. Paul, 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 Iowa. 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 online at:

http://gacc.nifc.gov/eacc/predictive/predictive.htm

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 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 - Station inspection and instrument maintenance of fire weather observation systems are the responsibility of land management agencies. NWS forecasters may monitor data quality from observation sites.

The following steps are procedures for implementing a new RAWS.

Step 1 - The federal land management agencies (USFS, NPS, USFWS, BLM, BIA, etc.) and the state agencies (Dept of Natural Resources (DNR) and a few misc. personnel (Nature Conservatory, etc.) begin the process by deciding to install a RAWS. Land management agencies sometimes request input from NWS personnel as to siting criteria.

NWS offices are required (by the Interagency Agreement) to provide it if requested from the land management agencies. Also, notify the NWS Central Region Headquarters to keep them informed throughout the process of RAWS implementation.

Step 2 – Land management agencies will request a 6-digit code/ID for the new RAWS station. Contact the EACC fire weather program manager/ meteorologist to obtain a new 6 digit WIMS ID. EACC will then share the ID and information with NWS partners.

Step 3 - Once a 6-digit ID number is coordinated/determined, the Regional Fire Weather Program Manager will provide it to the requestor, and cc: the NWS office and the appropriate USFS personnel.

Step 4 - It's the responsibility of the requestor/land management person to notify WIMS in order for the observations to be received/sent from the WIMS. If the requestor is in need of an NFDRS forecast from the NWS for WIMS, he or she will need to coordinate with the appropriate NWS office to begin service. The NWS office will need to coordinate with the NWS Regional Fire Weather Program Leader.

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.

V. JOINT RESPONSIBILITIES

A. Meteorological training can be provided either by NWS or the EACC meteorologist. Each NWS office has a Fire Weather Program Leader, who is qualified to teach courses up 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 or other NWS forecasters will participate in coordination conference calls, primarily in the spring fire season. This duty will be shared by the program leaders. The NWS representative should be prepared to provide a statewide briefing highlighting significant weather trends as well as possible critical fire weather situations.

VI. EFFECTIVE DATES ON THE AOP

This document will be effective approximately from March 1, 2016 to February 28, 2017.

VII. APPENDICES

A. Haines Index
B. Smoke Management
C. Address and Phone Directory
D. NFDRS RAWS Site Catalog and Contact list
E. Precipitation and sky terminology and NOAA Radio
F. Interagency Agreement for Meteorological Services

APPENDIX A

HAINES INDEX

What is the Haines Index?

The Haines Index combines the effects of dry air and instability to determine the potential for large fire growth. Its purpose is to identify weather conditions that may allow an existing fire to spread rapidly or exhibit extreme fire behavior. It should NOT be used to predict the potential or probability for wildfires to ignite. No such danger or wording will be conveyed in any NWS products. The Haines Index is most applicable to plume-dominated fires. The Haines Index does not account for wind.

The Haines Index contains two components, one to assess the dry air, and the other to measure the instability. Dry air affects fire behavior by lowering fuel moisture, which increases the amount of fuel available to the fire and enhances the probability of spotting. Instability is caused by warming the lower levels of the atmosphere, cooling the higher levels, or by a combination of the two processes. An unstable air mass promotes the formation of rising currents of air and thus increases the vertical extent of a smoke column. Wildfires that burn in a dry, unstable environment can become plume-dominated and are often able to generate their own strong surface winds. Ground elevation will determine which of three levels in the atmosphere will be used to compute the Haines Index. In Wisconsin, the low-level layer between 950 mb and 850 mb will be used.

Computing the Haines Index

Haines Index = Stability + Moisture = A + B

Stability Term (elevation dependent. FSD and OAX may use 850MB and 700 MB resepectively.)
= 950 MB Temperature - 850 MB Temperature
Let A equal the following values according to the temperature differences

A = 1 when stability term is 3 degrees C or less
A = 2 when stability term is 4 to 7 degrees C
A = 3 when stability term is 8 degrees C or more

Large positive values of the stability term indicate an unstable layer of the atmosphere near the earth's surface. Negative values indicate a temperature inversion.

Moisture Term = 850 MB Temperature - 850 MB Dew Point Temperature
B = 1 when moisture term is 5 degrees C or less
B = 2 when moisture term is 6 to 9 degrees C

B = 3 when moisture term is 10 degrees C or more
The value of the moisture term will always be positive. The greater the value of this term, the drier the air is.

Significance of the Haines Index values

2 or 3	Very Low (moist, stable air)
4	Low
5	Moderate
6	High (dry, unstable air)

An example calculation

950 MB Temperature = 27 degrees C
850 MB Temperature = 18 degrees C
850 MB Dew Point = 14 degrees C
Haines Index = Stability (A) + Moisture (B)
From the tables above
950 MB Temp - 850 MB Temp = 27-18 = 9 A Stability term of 9, so let A = 3.
850 MB Temp - 850 MB Dew point = 18 - 14 = 4 A Moisture term of 4, so let B = 1.

A + B = 3 + 1 = 4.

An Index value of 4 corresponds to a “Low” category. The conclusion is that extreme fire behavior would not be expected on this day.

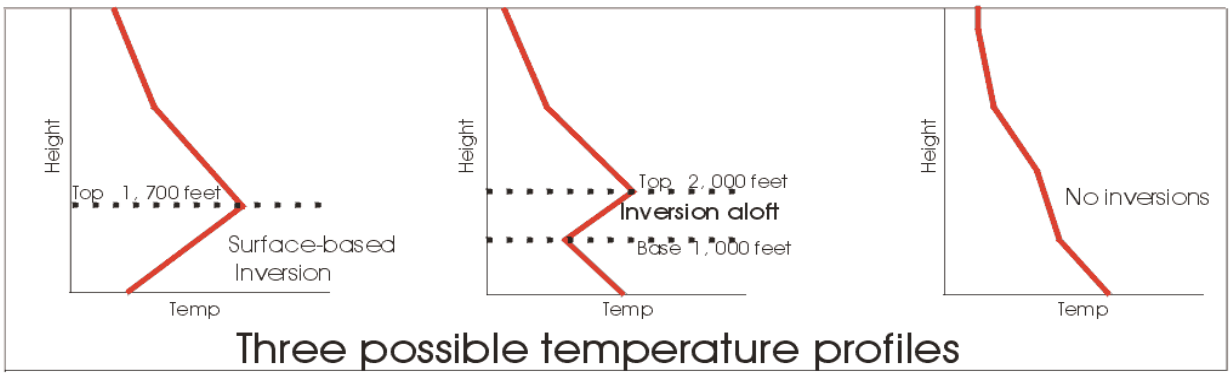
APPENDIX B

SMOKE MANAGEMENT

The Clean Air Act requires land management agencies to address the issue of smoke management in its prescribed burns. The goal is to burn in atmospheric conditions that would encourage smoke to rise to such a level that the smoke is dispersed as much as possible to reduce a number of health and safety risks near the fire.

The National Weather Service will support the smoke management efforts of federal, state, and local agencies as well as organizations involved in such burning. **The NWS will provide the mixing height, transport wind and dispersion index throughout the fireweather season in the fire weather planning forecast. These values will represent the average values from noon to 6 pm.** The NWS will also include the mixing height, transport wind and dispersion index, upon request of the land agency, in spot forecasts.

The three weather parameters of smoke management forecasts are mixing layer (or height), transport winds, and dispersion index. For smoke management purposes, the mixing layer is usually considered the lowest layers of the atmosphere bounded by the earth's surface and the bottom of any temperature inversion which may exist aloft. If a temperature inversion is based at the surface, then there is no mixing layer. A temperature inversion would serve to trap smoke at low levels, or would prevent sufficient lofting of smoke to a level where winds would dilute or transport it away from the area. See the figure below:



Three upper air temperature profiles which affect smoke dispersal differently. a) a surface-based inversion is an absolutely stable condition that traps smoke and prevents lofting. b) An elevated inversion is unstable or neutral and allows limited smoke rise, but the smoke will stop rising at the base of the inversion aloft. c) When no inversions are present, smoke is free to rise. However, the existing (ambient) lapse rate will determine the rate of rise and the plume characteristics.

The transport wind (knots) is defined as the average wind speed and direction through the

mixing layer. The transport wind may suggest the need for surveillance or resource location at downstream areas for the purpose of minimizing the danger posed by spotting due to firebrands and to determine the impacts of smoke on a sensitive area.

The Dispersion Index is intended to serve as a single adjective index which describes how smoke will disperse on that day. The Dispersion Rate is given by the following formula:

Dispersion Rate = (Mixing Height in feet) x (Transport Wind in knots)

Below is an interpretation of the values:

Dispersion Index	Dispersion Rate
< 13,000	Poor
13,000 - 29,999	Fair
30,000 - 59,999	Good
60,000 or greater	Excellent

The SMP contains guidelines for using the index and should be consulted for those details. Most smoke management inputs to software programs and nomograms are in metric units. A table for conversion among various units is provided on the next page.

Smoke management models require input of parameters in metric units. The National Weather Service uses a variety of units of measure for wind and height. To minimize confusion and to make the conversion of units easier, the following conversion factors will prove helpful.

Multiply	By	To get
Feet	0.308	Meters
Feet	0.0152	Chains
Statute Miles	1609.34	Meters
Statute Miles	1.60934	Kilometers
Statute Miles	0.8684	Nautical Miles
Statute Miles	80	Chains
Nautical Miles	0.6080	Feet
Nautical Miles	1.152	Statute Miles
Nautical Miles	1853.25	Meters
Nautical Miles	1.85325	Kilometers
Chains	66	Feet
Chains	20.12	Meters
Chains	0.0125	Statute Miles
Meters	3.281	Feet
Meters	0.0497	Chains
Meters	0.00062	Statute Miles
Meters	0.00054	Nautical Miles
Kilometers	3280.84	Feet
Kilometers	0.6214	Statute Miles
Kilometers	0.5396	Nautical Miles

Knots	1	Nautical Miles Per Hour
Knots	1.152	Statute MPH
Knots	1.689	Feet Per Second
Knots	0.515	Meters Per Second
Knots	1.853	Kilometers Per Hour
Statute MPH	0.868	Knots
Statute MPH	1.467	Feet Per Second
Statute MPH	0.447	Meters Per Second
Statute MPH	1.609	Kilometers Per Hour
Statute MPH	88	Feet Per Minute
Kilometers Per Hour	0.278	Meters Per Second
Kilometers Per Hour	0.540	Knots
Kilometers Per Hour	0.621	Miles Per Hour
Kilometers Per Hour	0.911	Feet Per Second
Meters Per Second	3.6	Kilometers Per Hour
Meters Per Second	1.943	Knots
Meters Per Second	2.237	Miles Per Hour
Meters Per Second	3.281	Feet Per Second
Meters Per Second	196.85	Feet Per Minute

APPENDIX E

PRECIPITATION AND SKY TERMINOLOGY AND NOAA WEATHER RADIO

PROBABILITY OF PRECIPITATION TERMS (POP)

Terminology	**POP**
NONE OR SLIGHT CHANCE	10%
SLIGHT CHANCE	20%
CHANCE	30 TO 50%
LIKELY	60 TO 70%
NO MODIFIER	80 TO 100%

SHOWER AND THUNDERSTORM TERMINOLOGY	**POP**
(assumes 100% probability that showers and thunderstorms will occur)	
ISOLATED OR NONE	10%
ISOLATED OR WIDELY SCATTERED	20%
SCATTERED	30-50%
NUMEROUS	60-70%
NO MODIFIER	80-100%

CLOUD COVER will be subject to some variability in amount or location.

SUNNY/CLEAR...no clouds. 0/8 of opaque clouds.

MOSTLY SUNNY/MOSTLY CLEAR...the prevailing condition is sunny or clear but some clouds may be present either over a portion of the area or for a short period of time over the entire area. 1/8 to 2/8 of opaque clouds.

PARTLY CLOUDY/PARTLY SUNNY...3/8 to 5/8 of the sky will be covered by opaque clouds.

MOSTLY CLOUDY OR CONSIDERABLE CLOUDINESS...6/8 to 7/8 of the sky will be covered by opaque clouds.

CLOUDY...the sky is completely covered with clouds (8/8).

NOAA ALL HAZARDS RADIO

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

APPENDIX F

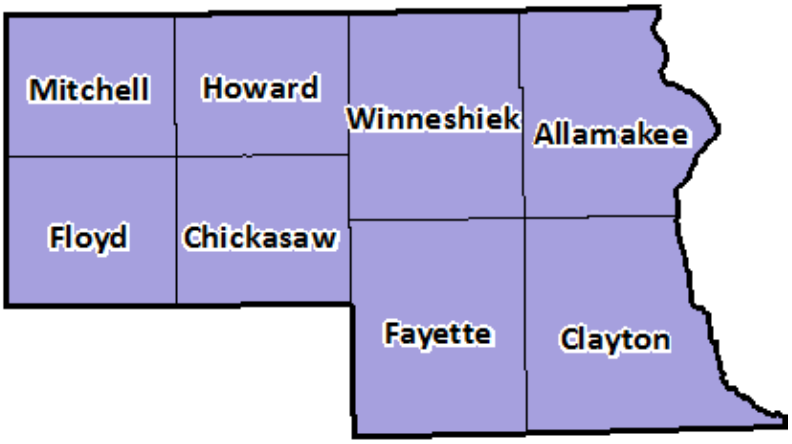
Please go to the address below to view the
Interagency Agreement for Meteorological and other Technical Services

http://radar.srh.noaa.gov/fire/docs/2008_National_Agreement.pdf

APPENDIX G

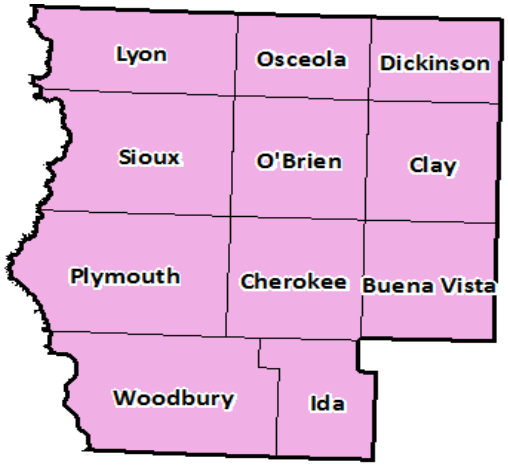
This appendix will highlight important plan highlights, dates and any differences between each WFO's fire weather plan for Iowa with respect to their area of responsibility.

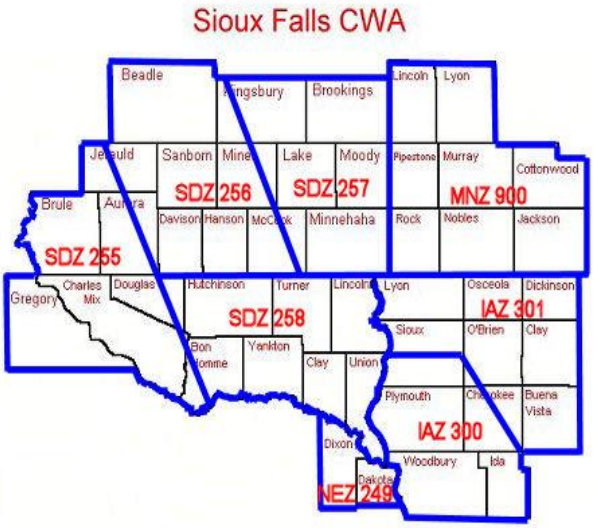
WFO LACROSSE:



1: Fire Weather Zones: (none defined in IA). Use individual counties.
2: Fire weather season will be variable with the needs of the customer.
3: Spot requests will be taken from customers at any time.
4: AN RFD value is NOT in the ARX product suite.
5: RFW parameters are 20 mph and 25 % relative humidity. Fuel dryness and wind gusts are also a consideration.

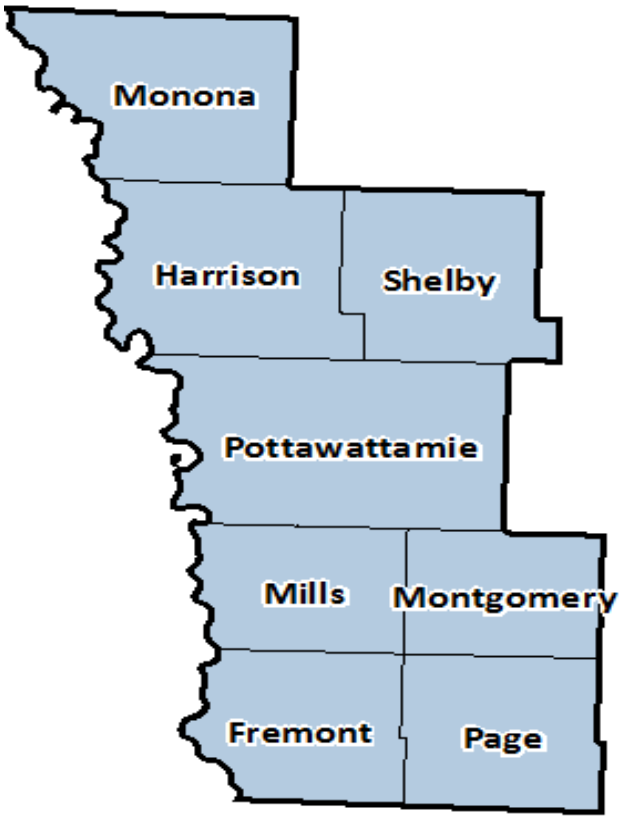
WFO SIOUX FALLS:





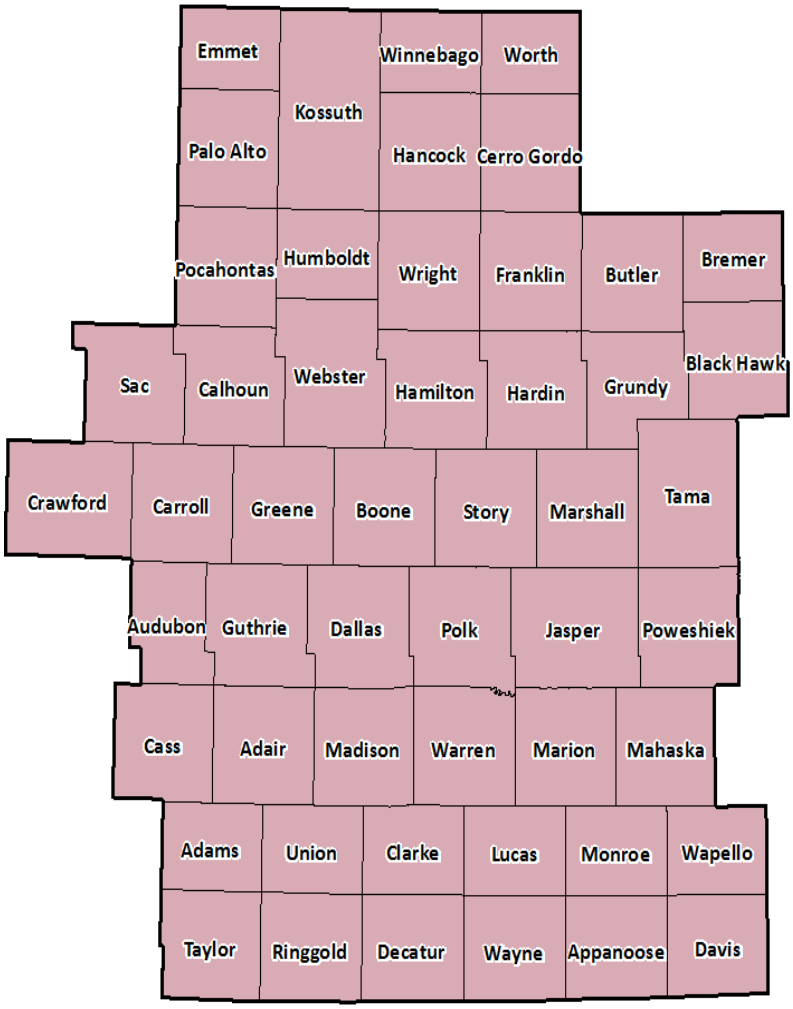
1: Fire Weather Zones: (IA zones are 300, 301) FSD does not break product down into county wide zones. Their fire weather zones consist of one or more counties.
2: The fire weather season will be variable. General dates are that it will begin by April 1st and end around November 15th.
3: The Fire Weather Planning Forecast product (FWF) will be in a narrative format and issued twice daily from March 1st through May 31st and from August 15th through November 15th. The FWF will be once daily for the rest of the year.
4: Spot requests should be made the evening before a burn is anticipated but will be accepted anytime.
5: The RFD will be issued daily from April 1st through November 15th. It will also be issued during the winter months if the index reaches very high or extreme.
6. The RFW product will not be played on the NOAA All Hazards Radio.
7. RFW parameters are 25 mph and 25 % relative humidity. Fuel dryness and wind gusts are also a consideration.

WFO OMAHA:



1: Fire Weather Zones: None defined in IA. Use individual counties.
2: Fire weather season will be March 1 to November 30 but variable, based on weather.
3: An RFD product will be issued twice daily throughout the year.
4: Spot requests should be sent in the evening before the customer thinks they will burn but will be accepted at any time.
5: The fire weather planning forecast (FWF) will be issued once daily at 5 AM during the fire weather season.
6: RFW parameters are 25 mph and 25 % relative humidity. Fuel dryness and wind gusts are also a consideration.

WFO DES MOINES (JOHNSTON):



1: Fire Weather Zones: Not defined. Use individual counties.

2: The Fire Weather Season shall run from March 1st through November 15th. Weather will be considered and start/end dates may be adjusted.

3: The FWF product will be issued once daily from June 1st through August 31st. Twice daily the remainder of the fire weather season from March 1st through November 15th. Fire weather grid production will occur all year.

4: Spot requests should be made the evening before a burn is anticipated but they will be accepted at any time.

5: The following products WILL NOT be issued by WFO DES MOINES:

a) Rangeland (Grassland) Fire Danger Index Statement (RFD)

6: RFW parameters are 25 mph and 25 % relative humidity. Fuel dryness and wind gusts are also a consideration.

WFO DAVENPORT:

1: Fire Weather Zones: Not defined. Use individual counties.
2: The fire weather season will run from March1st through November 15th.
3: Spot requests are taken from customers any time.
4: The following products WILL NOT be issued by WFO DAVENPORT:
a) Rangeland (Grassland) Fire Danger Statement (RFD)
5: The FWF product will run from March 1st through November 15th.
6: RFW parameters are 25 mph and 25 % relative humidity. Fuel dryness and wind gusts are also a consideration.