

FIRE BEHAVIOR FORECAST

FORECAST NUMBER: 040	TYPE OF FIRE: Initial Attack
FIRE NAME: MNICS Statewide Forecast	OPERATIONAL PERIOD: 05/07/2021
DATE ISSUED: 05/07/2021	TIME ISSUED: 0830
UNIT: MN-MNCC	SIGNED: Travis Verdegan Typed/printed: Travis Verdegan

INPUTS

WEATHER SUMMARY:

Some cloud cover built up over the state and may have dropped some very light precip on the eastern side of the state overnight.

Mostly clear skies today under high pressure with some greater cloud cover over the NE

Temps stay cool under continued northerly flow with highs in the low 50s over the north and mid 50s south.

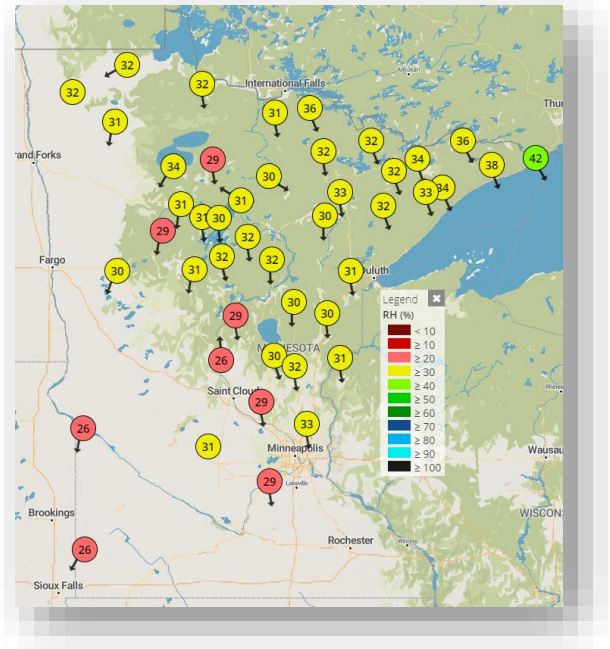
Winds from the north at 8 – 11 consistently across the state.

RHs forecasted to stay a little higher today with 20s and 30s possible across the state.

Tomorrow brings more of the same conditions.

Haines Index: 4

Figure 1 - Forecasted 1700 RH 05/07/21



OUTPUTS

FIRE BEHAVIOR

GENERAL:

With the weather pattern we've been in as winds come and go so to will our higher predicted fire behavior. Today sees a drop off, however still notable fire weather, from yesterdays.

RHs under the current pattern of northerly flow have not shown the tendency to extensively drop into the low 20s or teens so far. It appears that this pattern will persist at least through the weekend. This in turn is holding the FFMC in the 90 to 91 range, which are elevated values but not following the type of quickly elevating pattern we've seen at other times of the year.

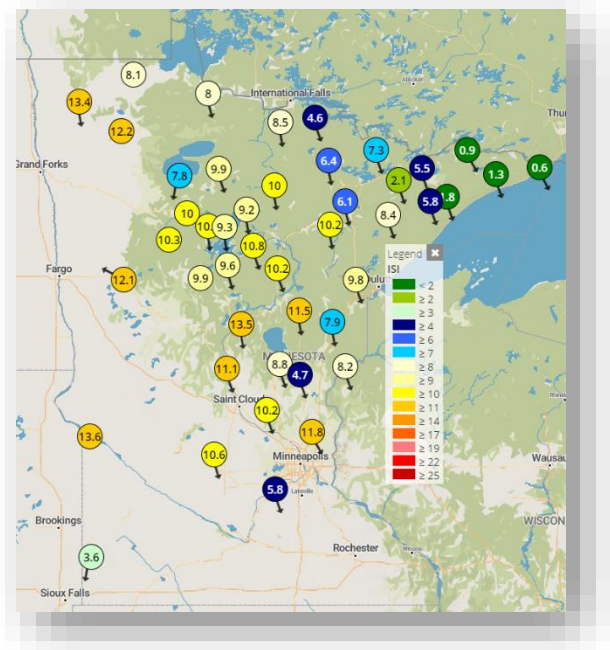
Build up is the big part of the story under these conditions. Day over day drying will continue to occur and heavier fuels will continue to be more and more available.

Along with the expected build up in heavier fuels comes potential for greater intensities which in turn increases potential for crown fire behavior in coniferous fuel types that are at a higher level of susceptibility due to the effects of the spring dip.

Fine Dead Fuel Moisture: 4% Unshaded – 7% Shaded

Prob. of Ignition: 70% Unshaded – 40% Shaded

Figure 2 - Forecasted Daily ISI 05/07/21



SPECIFIC:

MN FFMC: 90 BUI: 36 WS: 10	Flame Length	Rate of Spread (ft/min ≈ ch/hr)	Fire Type	60 Minute Spread Size (acres)
Grass (90% cured – 3 tons/acre)	12 - 13	70 - 75	Surface	85
Lowland Grass (100% cured – 5 tons/acre)	17 - 18	85 - 90	Surface	130
Young Jack Pine 95% LFM & Boreal Spruce	14 - 15	30 - 35	Torching	38
Pine Plntn. & Mat. JP	5 - 6	11 - 13	Surface	4
Mixdwood (25% Fir) & Red & White Pine Timber	6 - 7	13 - 15	Surface	6
Hardwood/Aspen	4 - 5	6 - 8	Surface	2

Outlook:

We appear to be stuck in the current pattern till at least Tuesday when temps start to pick up, winds shift to westerly and RHs drop off. This signal of a pattern change should be watched closely as it is likely that as the pattern shifts conditions will intensify and increase the potential for a large problematic fire.

The CPC outlook for 6 – 10 day outlook shows average temps and average precip with the 8 – 14 day showing average temps with slightly above average precip..

Drought monitor data shows a similar pattern to last week with droughty conditions in the NW and South.

*Figure 3 - Weekly
Summary Forecast for
Northwestern MN Issued
by NWS Grand Forks*

Goodridge, MN Weekly Summary		Fri May 7	Sat May 8	Sun May 9	Mon May 10	Tue May 11	Wed May 12	Thu May 13	Fri May 14
Max Temp, °F		56	59	52	58	65	67	68	68
Min Temp, °F		26	32	32	28	33	39	41	44
Max RH, %		85	75	72	78	69	70	79	79
Min RH, %		29	25	32	29	24	27	32	42
Max Wind, mph		14	14	15	12	12	14	14	15
Min Wind, mph		3	6	9	6	6	8	9	10
Max Wind Gust, time/dir.		11 AM ↘ 6 PM ↘	4 PM ↘	12 PM ↘	12 PM ↘	12 PM ↘	1 PM ↗	10 AM ↗	
Max Wind Gust, mph		20	16	22	16	17	20	21	18
Min Wind Gust, mph		6	7	14	6	8	13	13	16
Max Cloud Cover, %		5	55	48	23	24	44	48	53
Min Cloud Cover, %		1	2	13	3	4	25	19	46
Max Prob. of Precip., %		0	2	3	2	2	4	11	21

*Figure 4 – Weekly
Summary Forecast for
Northeastern MN Issued
by the NWS Duluth*

Cook, MN Weekly Summary		Fri May 7	Sat May 8	Sun May 9	Mon May 10	Tue May 11	Wed May 12	Thu May 13	Fri May 14
Max Temp, °F		51	57	52	55	64	67	67	67
Min Temp, °F		25	23	30	28	31	36	40	42
Max RH, %		75	74	75	75	72	67	73	73
Min RH, %		28	22	29	26	21	25	32	38
Max Wind, mph		10	7	8	7	6	6	6	9
Min Wind, mph		2	1	3	2	2	2	3	5
Max Wind Gust, time/dir.		10 AM ↘ 12 PM ↘	3 PM ↘	4 PM ↘	1 PM ↘	3 PM ↗	3 PM ↗	12 PM ↗	
Max Wind Gust, mph		17	13	15	14	13	12	13	21
Min Wind Gust, mph		5	3	8	6	3	5	6	7
Max Cloud Cover, %		70	47	49	42	21	53	43	61
Min Cloud Cover, %		11	2	15	19	3	22	31	34
Max Prob. of Precip., %		4	2	6	7	1	6	16	22

*Figure 5 – Weekly
Summary Forecast for
Southern MN Issued by
NWS Chanhassen*

Eden Valley, MN Weekly Summary		Fri May 7	Sat May 8	Sun May 9	Mon May 10	Tue May 11	Wed May 12	Thu May 13	Fri May 14
Max Temp, °F		55	55	56	55	61	63	65	68
Min Temp, °F		32	33	37	34	36	40	43	47
Max RH, %		75	75	79	78	72	70	79	83
Min RH, %		30	35	37	32	29	35	40	48
Max Wind, mph		13	9	10	7	6	10	10	14
Min Wind, mph		5	2	2	2	2	3	6	6
Max Wind Gust, time/dir.		10 AM ↘ 11 AM ↘	12 PM ↘	3 PM ↘	3 PM ↘	12 PM ↗	2 PM ↗	3 PM ↗	
Max Wind Gust, mph		17	15	16	15	14	15	16	18
Min Wind Gust, mph		7	5	6	6	5	7	8	7
Max Cloud Cover, %		17	82	77	44	30	54	39	59
Min Cloud Cover, %		2	6	51	12	4	31	28	26
Max Prob. of Precip., %		0	26	26	4	1	13	12	24

AIR OPERATIONS:

https://www.aviationweather.gov/data/products/turbulence/F12_gtg_max_total-lgt.gif

Note: This is a general fire behavior forecast for the state of Minnesota. It is designed to provide wildland fire managers with an overall geographic area view of fire behavior potential and to help wildland firefighters with the fire order "initiate all actions based on current and expected fire behavior". Firefighters must use onsite observations and spot weather forecasts to calculate site-specific fire behavior for individual wildland fires. Fire behavior spread rates describe only surface fire conditions and do not factor crowning or spotting.

Safety:

Extreme Fire Behavior – II

Changes in fire behavior are always present in incidences of shelter deployment. Firefighters need to maintain situation awareness of live and dead fuel moisture conditions, as well as predicted and current weather conditions. As fire behavior moves from mild to moderate to extreme, it is critical to respond correctly to the changing situation.

Discuss how the following factors can contribute or lead to extreme fire behavior:

- Frost kill: late or unusually extensive freezes, high loading of frost-killed fuels.
- Drought Conditions: Live Fuel Moistures Index, Keetch-Byram Drought Index (KBDI), Soil Moisture Index, low humidity, high temperatures.
- Slope: increases fire spread uphill, preheats fuels by convection; may channel winds.
- Sea Breeze/Foehn: wind direction may vary throughout the day; humidity changes may occur; strong wind velocities may drive fire behavior.

To aid situation awareness:

- Track National Fire Danger Rating System (NFDRS) live and dead fuel moisture outputs.
- Take hourly weather observations and track the hourly changes. By tracking fuel moisture and weather observations and using the Fire Severity Related to Fuel Moisture Chart, firefighters can be alerted to conditions leading to situations where there is a high potential for extreme fire behavior.

References

1. NWS: Lightning Activity Level. Available at: [HYPERLINK "https://graphical.weather.gov/definitions/defineLAL.html"](https://graphical.weather.gov/definitions/defineLAL.html)
<https://graphical.weather.gov/definitions/defineLAL.html>
2. National Wildfire Coordinating Group: PMS 437, Dead Fuel Moisture Content. Available at: [HYPERLINK "https://www.nwcg.gov/publications/pms437/fuel-moisture/dead-fuel-moisture-content"](https://www.nwcg.gov/publications/pms437/fuel-moisture/dead-fuel-moisture-content)
<https://www.nwcg.gov/publications/pms437/fuel-moisture/dead-fuel-moisture-content>
3. National Wildfire Coordinating Group: PMS 437, Probability of Ignition. Available at: [HYPERLINK "https://www.nwcg.gov/publications/pms437/fuel-moisture/probability-of-ignition"](https://www.nwcg.gov/publications/pms437/fuel-moisture/probability-of-ignition)
<https://www.nwcg.gov/publications/pms437/fuel-moisture/probability-of-ignition>
4. Mesowest, Great Lakes Fire & Fuels: Fire Behavior Prediction Calculator. Available at: [HYPERLINK "https://glff.mesowest.org/tools/"](https://glff.mesowest.org/tools/)
<https://glff.mesowest.org/tools/>
5. Aviation Weather Center (NWS): GTG - Max combined Intensity (1000 ft. MSL to FL500) [Light]. Available at: [HYPERLINK "https://www.aviationweather.gov/data/products/turbulence/F12_gtg_max_total-lgt.gif"](https://www.aviationweather.gov/data/products/turbulence/F12_gtg_max_total-lgt.gif)
https://www.aviationweather.gov/data/products/turbulence/F12_gtg_max_total-lgt.gif

6. USNO, Astronomical Applications Dept.: Application Programming Interface. Available at: [HYPERLINK "https://aa.usno.navy.mil/data/docs/api.php"](https://aa.usno.navy.mil/data/docs/api.php) <https://aa.usno.navy.mil/data/docs/api.php>
7. NWS, Twin Cities: Routine Fire Wx Fcst. Available at: [HYPERLINK "https://forecast.weather.gov/product.php?site=mpx&product=FWF&issuedby=mpx"](https://forecast.weather.gov/product.php?site=mpx&product=FWF&issuedby=mpx) <https://forecast.weather.gov/product.php?site=mpx&product=FWF&issuedby=mpx>
8. NWS, Duluth: Routine Fire Wx Fcst. Available at: [HYPERLINK "https://forecast.weather.gov/product.php?site=dlh&product=FWF&issuedby=dlh"](https://forecast.weather.gov/product.php?site=dlh&product=FWF&issuedby=dlh) <https://forecast.weather.gov/product.php?site=dlh&product=FWF&issuedby=dlh>
9. NWS, Grand Forks: Routine Fire Wx Fcst. Available at: [HYPERLINK "https://forecast.weather.gov/product.php?site=fgf&product=FWF&issuedby=fgf"](https://forecast.weather.gov/product.php?site=fgf&product=FWF&issuedby=fgf) <https://forecast.weather.gov/product.php?site=fgf&product=FWF&issuedby=fgf>
10. MPCA In: Current air quality. Available at: [HYPERLINK "https://www.pca.state.mn.us/air/current-air-quality"](https://www.pca.state.mn.us/air/current-air-quality) <https://www.pca.state.mn.us/air/current-air-quality>
11. NWS, Climate Prediction Center: Outlook Maps, Graphs and Tables. Available at: [HYPERLINK "https://www.cpc.ncep.noaa.gov/products/forecasts/"](https://www.cpc.ncep.noaa.gov/products/forecasts/) <https://www.cpc.ncep.noaa.gov/products/forecasts/>
12. National Wildland Coordinating Group: Six Minutes for Safety. Available at: [HYPERLINK "https://www.nwcg.gov/committees/6-Minutes-for-safety"](https://www.nwcg.gov/committees/6-Minutes-for-safety) <https://www.nwcg.gov/committees/6-Minutes-for-safety>
13. MN DNR, Forestry In: Wildfire Information Center. Available at: [HYPERLINK "https://mndnr.gov/forestry/fire/wildfirereports_tools.html"](https://mndnr.gov/forestry/fire/wildfirereports_tools.html) https://mndnr.gov/forestry/fire/wildfirereports_tools.html | "indexes" https://mndnr.gov/forestry/fire/wildfirereports_tools.html#indexes