

# Fuels and Fire Behavior Advisory

## Minnesota's Forests and Grasslands

*Effective August 2<sup>nd</sup> 2021 Valid for 14 Days*

**Subject:** Minnesota's Fire Environment Has Seen Ups and Downs Amid Continually Deepening Drought

**Discussion:** The fire environment in Minnesota, which has been degrading since early 2020, is continuing down a path of drier and drier conditions even amid periodic wetter patterns. Rivers and lowlands are drying up making fuel beds receptive that typically are barriers to spread. Since last fall the worst locations are currently seeing precipitation deficits of 8 – 16 inches.

Short- and medium-term fire danger indicators fluctuate with wet and dry patterns as is to be expected. However, when rain does come it typically comes in amounts and coverage too light to be impactful to the longest-term indicators.

Summer fire seasons tend to be sporadic and limited in scope in MN however some of the state's largest wildfires have occurred in mid to late summer under lesser conditions in years past. The Pagami Creek Fire of 2011 grew to a size of 92,624 acres (most of that growth occurred in a one-day wind driven event) and conditions this year could result in fires of similar magnitude.

**Difference from normal conditions:** Fire danger indices from the Canadian Forest Fire Danger Rating System (CFFDRS) and the National Fire Danger Rating System (NFDRS) have been setting new record maximums already this year during times of peak conditions. The areas of greatest concern have shifted across the state as the summer has progressed. The early timing of these peak events sets this year apart from other dry years and expectations for late summer grow higher as cumulative effects of this drought build.

Fire occurrence so far this summer has been running 3 to 4 times the 10-year average for June and July. June had 228 fires (10-year average is 67) and July had 251 (10-year average 78).

### Concerns to Firefighters and the Public:

- Expect increasing ignitions from lightning in forest fuels. Human caused ignitions from fireworks and equipment are likely as grass fuels typical to human habitation are cured and receptive.
- Deep burning fires in duff layers of forest fuels and organics soils common to lowland grasses will require intensive mop up and monitoring to ensure line security. Smoldering fires may burn across non-mineral soil breaks and rekindle on the other side.
- Water from the air (aircraft or rainfall) will do little other than slow the forward spread of fires.
- Existing build-up, hot and dry conditions, and an extended amount of summer remaining will bring a very high to extreme risk of large catastrophic fires to the state.
- Extreme fire behavior, common under record setting conditions, will occur where fires, fuels, and weather elements (namely wind) align to create the worst conditions.

### Mitigation Measures:

- Staff resources adequately to deal with increased fire occurrence and advanced fire behavior.
- Consider indirect and extended attack when making tactical decisions related to line placement and type.
- Discuss options locally, like mineral soil breaks using heavy equipment or indirect attack, to mitigate the amount of effort needed to create high levels of line security. Don't underestimate the potential for holdovers in duff and organic soils.
- Ensure firefighters adequately assess potential fire behavior daily and have trigger points for when to disengage
- Brief out of state resources on current and expected fire behavior and familiarize them to the local fire environment.
- Discuss the limitations and mitigations for the use of lookouts in heavy timber and flat terrain.

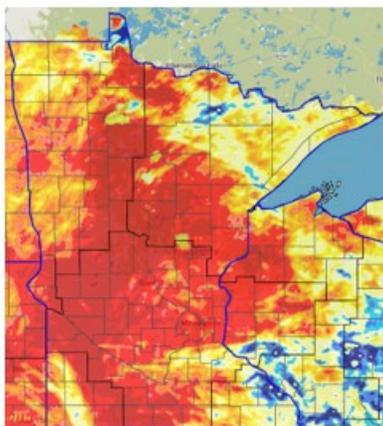
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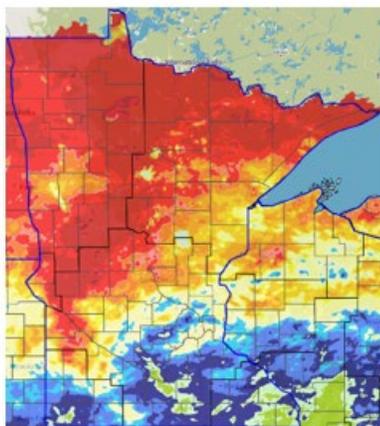
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### Progression of Canadian Forest Fire Danger Rating System (CFFDRS) Build Up Index (BUI) and Drought Code (DC) Summer 2021

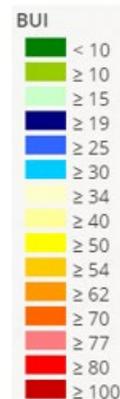
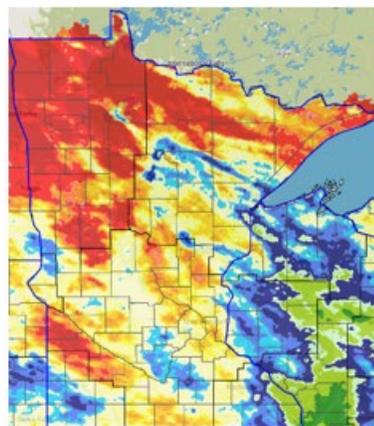
BUI Values June 18th



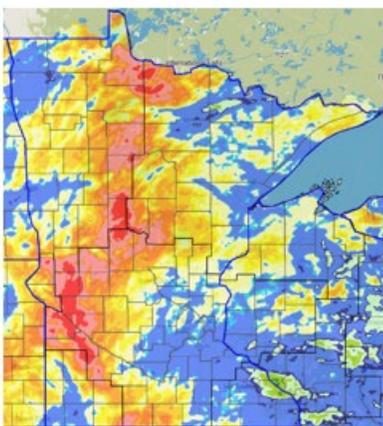
BUI Values July 18th



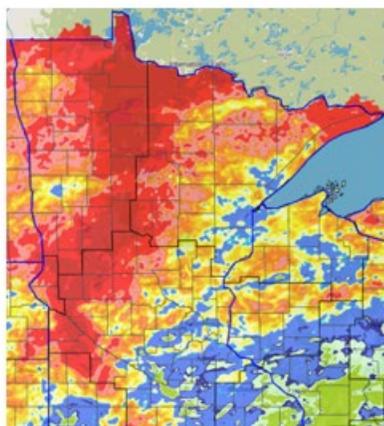
BUI Values August 1st



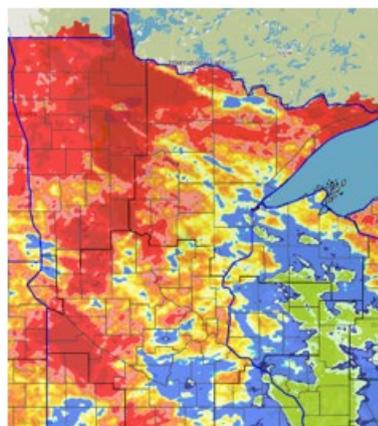
DC Values June 18th



DC Values July 18th



DC Values August 1st



- When considering fire danger three things need to be considered; How easily can a fire start? How fast can a fire spread? And what will a fire do when it spreads?
- The first two considerations are highly variable with day to day changes in temperature, wind, relative humidity, and recent precipitation.
- Two elements of CFFDRS are tracked to assess the final consideration and are much more stable over time.
- BUI – Combines elements of medium to long term reactivity and reflects fire danger well when coupled with daily fire weather elements. BUI typically peaks out in August – September.
- DC – Is used as a component of BUI and reflects conditions with the longest-term reactivity. DC represents seasonal precipitation deficits well. DC typically peaks out in September – October.

**Area of Concern:** Minnesota, statewide, forest and grassland fuels

**Issued By:** Travis Verdegan, Predictive Services, MIFC, Grand Rapids, MN.