

# THE ATMOSPHERIC RESERVOIR

*Examining the Atmosphere and Atmospheric Resource Management*

## FIRE WEATHER

By Mark D. Schneider

Meteorologists are known for forecasting the weather; however, there's a not so well-known type of forecasting that a niche group of meteorologists are tasked with and that's fire weather forecasting. In October, North Dakota experienced unusually dry conditions and strong winds that set the stage for fast moving wildfires in the northwestern part of our state. It's the job of fire weather forecasters to predict the occurrence of these dry conditions and warn emergency managers, government officials, and the general public about them.

Before the Ray/Tioga and Elkhorn and Bear Den Fires (burn scar images) started on October 5, National Weather Service Bismarck's Fire Weather Program Leader Jeff Schild and other staff meteorologists were issuing watches and warnings. Jeff commented that, "With respect to the fires of October 5, it was becoming quite apparent many days out that a strong cold front would be moving through, with winds to 60 miles per hour and low humidity values down to 25 percent forecasted. Therefore, a Fire Weather Watch was issued for the area affected by the fires well in advance, at 3:20 AM on Thursday, October 3. We continued to monitor the situation, and by Friday afternoon, October 4, it was becoming clear that a critical event was imminent, so a Red Flag Warning was issued at 1:02 PM. We also conducted a briefing with the North Dakota Department of Emergency Services that morning, so they were well aware of the situation. Additional briefings were conducted on Saturday, and we issued multiple spot forecasts for areas where fires started and were ongoing."

The difference between a watch and a warning depends on how confident a forecaster is that certain conditions or criteria will be met. Schild explained that "With our watches, we have 50 percent or greater confidence that criteria will be met. To issue a warning, we have 80 percent or greater confidence that criteria will be met." Schild is referring to the criteria in the Red Flag Matrix (see image). If Red Flag conditions are expected to occur in the next 12 to 72 hours, then a Fire Weather Watch is issued. A Red Flag Warning will be issued if the Red Flag criteria are expected to occur within the next 24 hours and are imminent or are occurring. In general, a weather watch means to "be prepared" and a warning means to "take action."

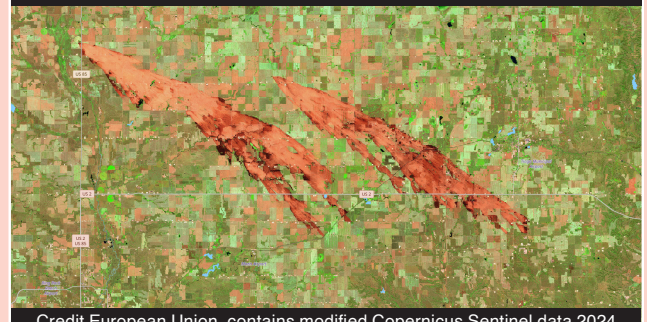
As North Dakota settles into winter, fire danger subsides due to the snow and colder temperatures. You can rest assured that Jeff Schild, along with other meteorologists from the Bismarck and Fargo-Grand Forks National Weather Service Offices will be monitoring conditions for next Spring when things warm up again.

Elkhorn and Bear Den Fires - 10072024 2024-10-07 00:00  
2024-10-07 23:59 Sentinel-2 L2A, SWIR



Credit European Union, contains modified Copernicus Sentinel data 2024

Ray Tioga Fire Burn Scars 2024-10-07 00:00  
2024-10-07 23:59. Sentinel-2 L2A, SWIR



Credit European Union, contains modified Copernicus Sentinel data 2024

**Red Flag Matrix**

Relative Humidity (%)

	40%	35%	30%	25%	20%	15%	10%
5 mph	NO	NO	NO	NO	NO	NO	NO
10 mph	NO	NO	NO	NO	NO	NO	NO
15 mph	NO	NO	NO	NO	NO	NO	NO
20 mph	NO	NO	NO	NO	YES	YES	YES
25 mph	NO	NO	YES	YES	YES	YES	YES
30 mph	NO	NO	YES	YES	YES	YES	YES
35 mph	NO	YES	YES	YES	YES	YES	YES
40 mph	NO	YES	YES	YES	YES	YES	YES

**Use Red Flag Matrix when Fire Danger is: High, Very High, or Extreme**

**Red Flag Conditions needed for at least 3 consecutive hours**