

# TOP 5 WEATHER EVENTS OF 2021



## **National Weather Service – Billings, MT**

*These weather events were voted upon by several of our meteorologists and deemed the five most intriguing in our forecast area. Obviously, there were other impactful weather events that occurred throughout the course of the year. We apologize if there were some that you felt were more meaningful and not on this list. Enjoy!*

## #5: November 16: Strong Winds along the Foothills

In our region on the eastern slopes of the mountains, we are prone to see periods of strong downslope (southwest to west) winds during the winter months. November 16<sup>th</sup> was one of



Tree Damage in Red Lodge (Shalosky)

those days, with strong winds at Livingston, Big Timber and Nye extending across the plains during the day. However, this wind event was different in that the scenario favored a couple of locations that don't always see strong winds: Red Lodge and Story. These locations experienced significant damaging winds.

Mountain waves are a result of strong winds and stability at mountain top level.

During the night and early morning, conditions were favorable (prior to a cold front) for very strong winds to surge down the east side of the Beartooths and Bighorns. Peak wind gusts

included a whopping 96 mph at Story and 81 mph at Bearcreek and Luther.

Tree and home damage were common in these areas.

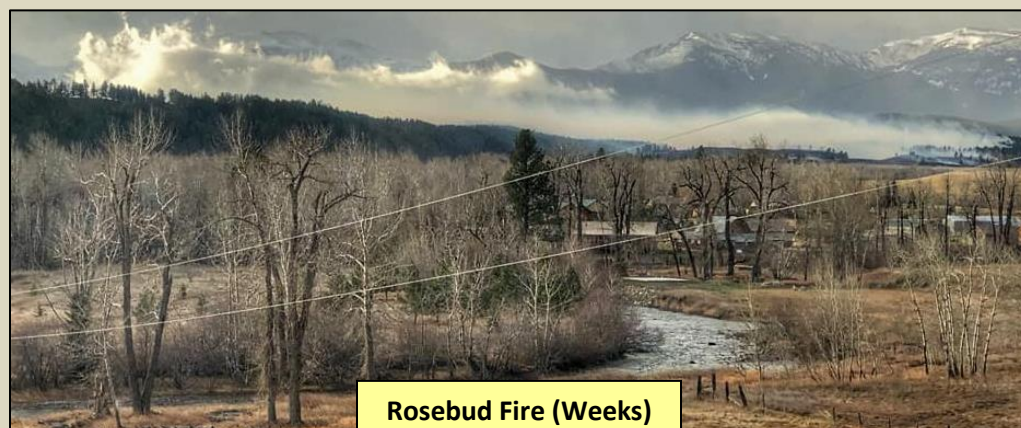
Furthermore, the wind and dry conditions caused a fire in the West Rosebud area (Rosebud Fire) which burned just over 1000 acres and resulted in some resident evacuations.



Tree Damage in Story (Kanard)

Though the strongest winds were observed along the foothills, gusts

from 50-70 mph also occurred across the plains, including a peak gust of 70 mph at the Billings airport.



Rosebud Fire (Weeks)

### Other notable peak gusts:

- Big Horn 74 mph
- Dayton 72 mph
- Hardin 72 mph
- Clyde Park 70 mph
- Belfy 65 mph



# #4: February 6-14: Cold Snap

A significant and long duration cold snap affected our region in the middle of February. This was made even more extreme by the fact that November through January was quite warm and dry.

Heavy snow fell from the 5<sup>th</sup> through the 7<sup>th</sup>, especially west of Hysham and Lame Deer. There were many accidents and a few notable road closures, including portions of I-90. Amounts of

10 to 15 inches were common. This set the stage for bitter cold air to surge out of Canada and linger for the next week.

The magnitude of the cold was by no means record-breaking, but the long duration of the cold snap made it exceptional. Most locations saw temperatures stay below zero



I-90 near Livingston (Gazette)

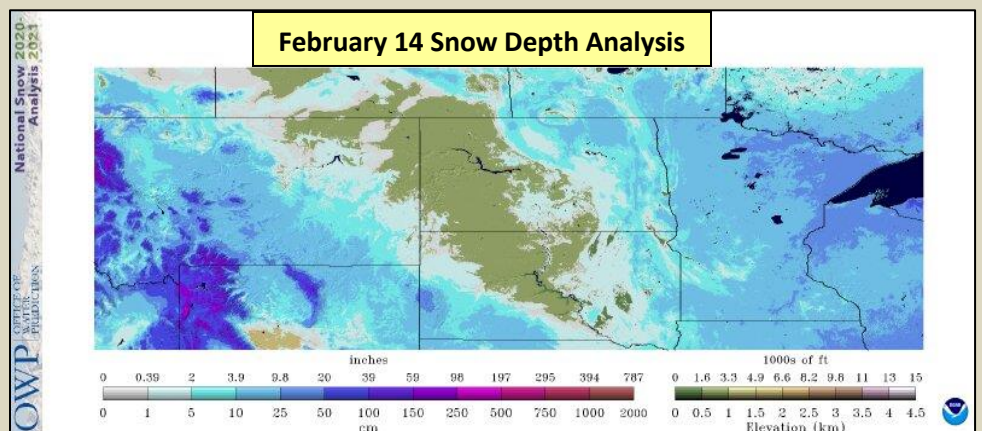
for about a week, which is difficult to do with mountains to our immediate west. The string of seven consecutive days with highs below zero at Billings tied for 3<sup>rd</sup> longest since records began in 1934, and was the longest since 1985! Baker Municipal Airport, a weather station with a period of record beginning in 1998, reported its record low temperature with -34° on the 14<sup>th</sup>. Miles City observed eight straight days with a low of at least -15°, its 4<sup>th</sup> longest on record.

SITE	COLDEST TEMPERATURE
Ingomar 9E	-44°
Roundup 15SW	-43°
Brandenberg	-40°
Mizpah	-38°
Hysham	-37°
Springdale	-37°
Baker	-34°
Forsyth	-34°
Miles City	-34°
Broadus	-32°
Hardin	-32°
Columbus	-30°
Bridger	-29°
Livingston	-28°
Billings NWS	-27°
Sheridan	-27°
Billings Airport	-22°



Billings Rims (Edwards)

Interestingly, northeast Montana and the western Dakotas missed out on the snowfall, and saw bitter cold temperatures without much snow cover.



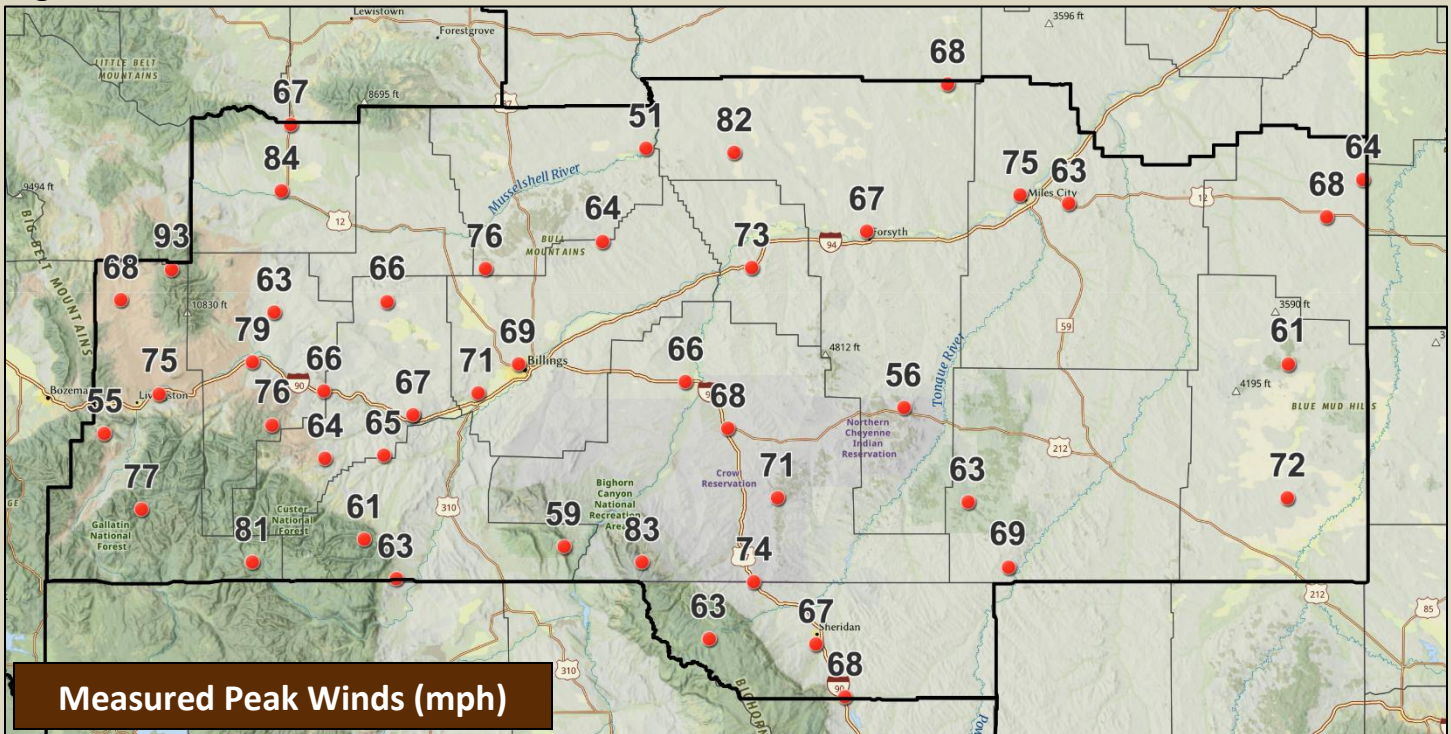
# #3: January 13: Strong Winds

Another wind event that made our list occurred back in January, and was remarkable for several reasons. Strong winds began along the foothills during the previous night (not an uncommon occurrence) then spread across the plains during the day as a Pacific cold front arrived.

In addition to the wind, it was very warm for the time of year. Billings (63°) and Sheridan (66°) set daily temperature records. Intense drying occurred behind the front and resulted in the development and rapid spread of a few grass fires. Blowing dust reduced visibility significantly across much of the area.



**WIND REPORTS:** Westerly wind gusts of 60 to 80 mph were common, and gusts exceeded 90 mph at some mountain sites. The peak gust observed was 93 mph in the Crazy Mountains at an elevation of 7300 feet. As you can see from the map below, very strong winds spread all the way to the Dakotas border. High gusts were also not short-lived – they persisted for several hours across the region.





**WIND IMPACTS:** The following is a list of impacts from the strong winds.

- Many large trees blown down
- Many power lines downed
- Several semis blown over
- Frequent reports of near zero visibility in blowing dust, resulting in severe driving conditions
- Scattered property damage, mostly minor
- Several grass fires – most notably the North Delphia Fire east of Roundup which burned three primary residences and several other outbuildings
- Montana Department of Transportation reported 35-40 incidents statewide and a high volume of calls (~1000)



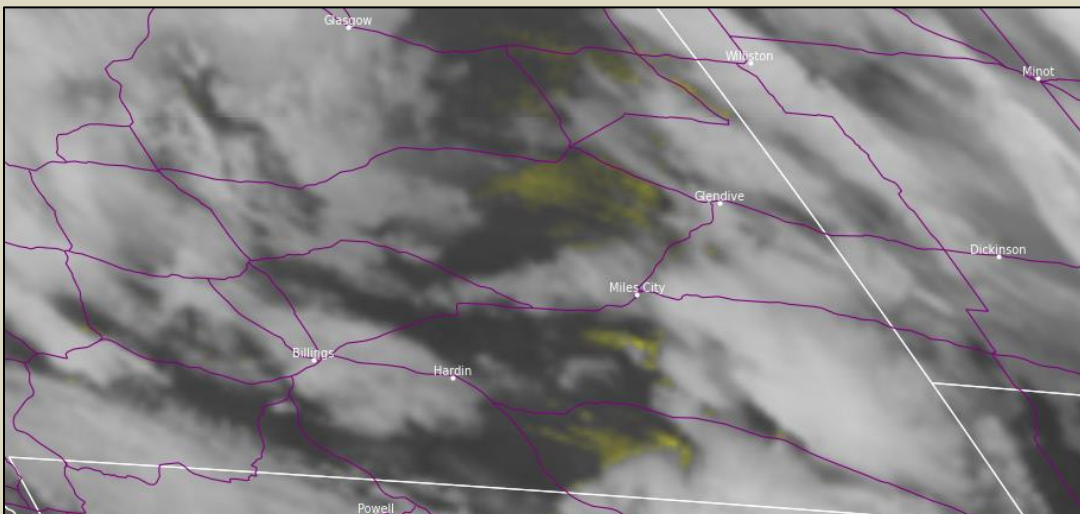
**Big Timber (Dennis-Phares)**



**View of Blowing Dust from Billings Rims (Anthony)**

**WIND RECORDS:**

The peak wind gusts at Billings (69 mph) and Miles City (75 mph) were each records for January. Sheridan (67 mph) reported its 4<sup>th</sup> highest January gust. The following day (January 14<sup>th</sup>) Miles City reported a peak gust of 66 mph, which ranks 2<sup>nd</sup> for January. Peak winds at these locations are measured at the local airports.



**Satellite Imagery shows Significant Blowing Dust (yellow hues)**

## #2: June 15: Hot & Dry with Wildfires

A warm and dry spring, along with a generally poor green up, led to some intense early summer heat with high pressure dominating the western part of the country. A historically hot and dry early summer day occurred in our region on the 15<sup>th</sup> of June.

**TEMPERATURES:** Many locations experienced triple digit heat. Sheridan tied its all-time record with a scorching high of 107°.

**DRYNESS:** June is typically a wet month with generally high humidity, but not this year. Here are some observed minimum relative humidities on the 15<sup>th</sup>:

- Roundup 3%
- Billings 4%
- Livingston 6%
- Sheridan 6%
- Miles City 6%
- Fishtail 6% (near Absarokee)
- Timbercrest 6% (near Red Lodge)

SITE	HIGH TEMP
Brandenberg	111°
Broadus	110°
Mizpah	110°
Crow Agency	109°
Miles City	109°
Billings NWS	108°
Forsyth	108°
Fort Smith	107°
Sheridan	107°
Busby	106°
Billings Airport	105°
Ryegate	102°
Big Timber	101°

**FIRES:** In addition to the heat and dryness, gusty winds impacted the region, especially along the western foothills where gusts ranged from 35 to 45 mph. The combination of all of these factors resulted in some wildfires (very unusual for mid-June). In fact, June 15<sup>th</sup> kicked off what would be a long fire season.



The Robertson Draw Fire near Red Lodge, human-caused on the 13<sup>th</sup>, became plume-dominated and grew from a small fire to over 20,000 acres. Evacuation orders were issued for some residences and campgrounds in the area, and several roads were closed (deemed local access only). A large area of forest land south of Highway 212 was closed to the public. The fire was not fully contained until September.

The Crooked Creek Fire, east of Bridger in the Pryor Mountains, is another fire that grew on this day.





Robertson Draw Fire (Warner)

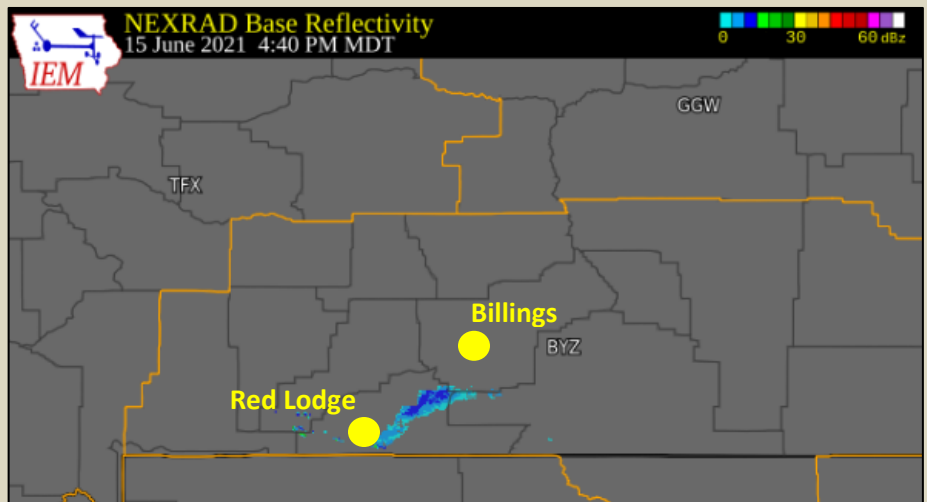


Crooked Creek Fire (Frost)



Robertson Draw Fire (Debello)

To the right is a late afternoon radar image. What you see is not a storm, but the Robertson Draw smoke plume being carried by the wind northeast toward Billings. You may recall the smoke on this day!



# #1: June – September: Hot & Dry Summer with Numerous Wildfires and Intensifying Drought

The number one weather story of 2021 is the overall heat and dryness of the summer, with intensifying drought and numerous wildfires. These conditions resulted from an amalgamation of a warm and mostly dry previous winter, a very warm/dry spring (with poor green up), and increasing precipitation deficits over a period of several months.

**HEAT & DRYNESS:** Many daily record high temperatures were set over the course of the summer, but there were three exceptionally hot days: June 15 (see event #3), July 19 and July 27. On each of these days, somewhere in our forecast area reached at least 110 degrees! Brandenburg hit 111° on June 15, Billings NWS 111° on July 19, and Broadus/Biddle/Powderville 110° on July 27. Precipitation was well below normal with the exception of August. The impacts of a warm and dry summer would have been worse if not for a wet August, which improved fire weather conditions and even promoted some slight late summer greening of grasses (very unusual for this region).

Here are some tidbits from meteorological summer (June-August) at each of our four main climate stations:

- Billings: First time ever that August (2.44”) was wetter than May – July (1.66”)
- Livingston: Had its 2<sup>nd</sup> wettest August on record (2.91”) after its 4<sup>th</sup> driest May – July
- Miles City: Reached at least 105° four times, the 2<sup>nd</sup> most on record
- Sheridan: Tied its all-time record high (107°) TWICE; has now reached 107° four times, but never 108°.

The following are some climate statistics from meteorological summer:

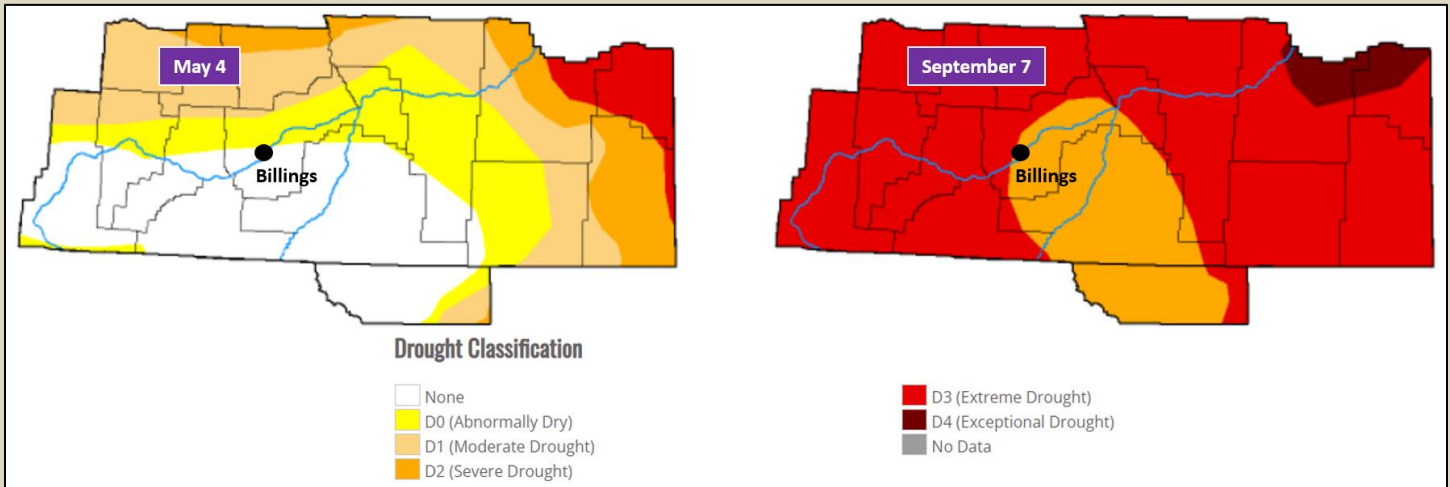
	Billings	Livingston	Miles City	Sheridan
<b>Average Temp</b>	74.4° (+ 4.5°) 4 <sup>th</sup> warmest	68.6° (+ 4.0°) 2 <sup>nd</sup> warmest	75.0° (+ 4.3°) 4 <sup>th</sup> warmest	71.1° (+ 3.9°) 4 <sup>th</sup> warmest
<b>Hottest Temp</b>	107° (July 19)	102° (July 19)	109° (June 15)	107° (Jun 15 & Jul 27)
<b># of 90° Days</b>	51 3 <sup>rd</sup> most	43 2 <sup>nd</sup> most	55 3 <sup>rd</sup> most	53 3 <sup>rd</sup> most
<b># of 100° Days</b>	10 2 <sup>nd</sup> most	2 7 <sup>th</sup> most	17 4 <sup>th</sup> most	8 6 <sup>th</sup> most
<b>Precipitation</b>	2.89” (- 1.42”) 28 <sup>th</sup> driest	4.67” (- 0.13”) 34 <sup>th</sup> driest	2.58” (- 2.35”) 11 <sup>th</sup> driest	1.79” (- 1.97”) 10 <sup>th</sup> driest

**INTENSIFYING DROUGHT:** Drought conditions steadily worsened through the course of the spring and summer. What began as mostly abnormally dry or moderate drought, became



severe to exceptional drought across the region by late summer. August precipitation did little to improve the drought classifications. September was another very warm and dry month. Here at the end of 2021 we are still in severe to extreme drought.

The following maps show how drought conditions changed from early May to September.



**WILDFIRES:** It was a very long fire season, beginning in June and lasting into October (significant precipitation finally arrived in the 2<sup>nd</sup> week of October). Here are some of the more notable fires that occurred in our region in 2021.

FIRE	LOCATION	IGNITED	CONTAINED	SIZE (acres)
Robertson Draw	Near Red Lodge	June 13	September 21	29,885
American Fork	Crazy Mountains	July 17	September 3	21,892
Crooked Creek	Pryor Mountains	June 15	September 14	4,141
Crater Ridge	Bighorn Mountains	July 17	October 15	7,682
MY Complex	SE of Roundup	July 9	August 1	27,811
Slough Grass	Near Colstrip	July 19	July 25	9,170
Poverty Flats	Near Hardin	July 27	August 12	66,134
Richard Spring	Near Colstrip	August 8	August 20	171,130
Trout Creek	Near Absarokee	August 8	August 12	16,200



**Richard Spring Fire – Hwy 39 near Colstrip (Rosebud County)**



**Crater Ridge Fire (McFarland)**



**Poverty Flats (PF) Fire (BIA)**

**Thanks for reading. We wish everyone a happy 2022!**