

# 2021 Weather in Review



Robertson Draw Fire in June (John Warner)

The following is a weather review for the Billings forecast area, which includes southeast Montana, parts of south central Montana, and Sheridan County in Wyoming.

Overall, 2021 was a warm and dry year, and it will definitely be remembered as such. The entire region saw temps that were above normal (by a couple degrees when averaged over the entire year), along with significant precipitation deficits. These temperature departures from normal would have been greater if not for the significant cold snap in mid-February and the cold air mass at the end of December. Only the months of February, August, October and December saw near or above normal precipitation. April through June, our climatological wettest time of year, was very dry.

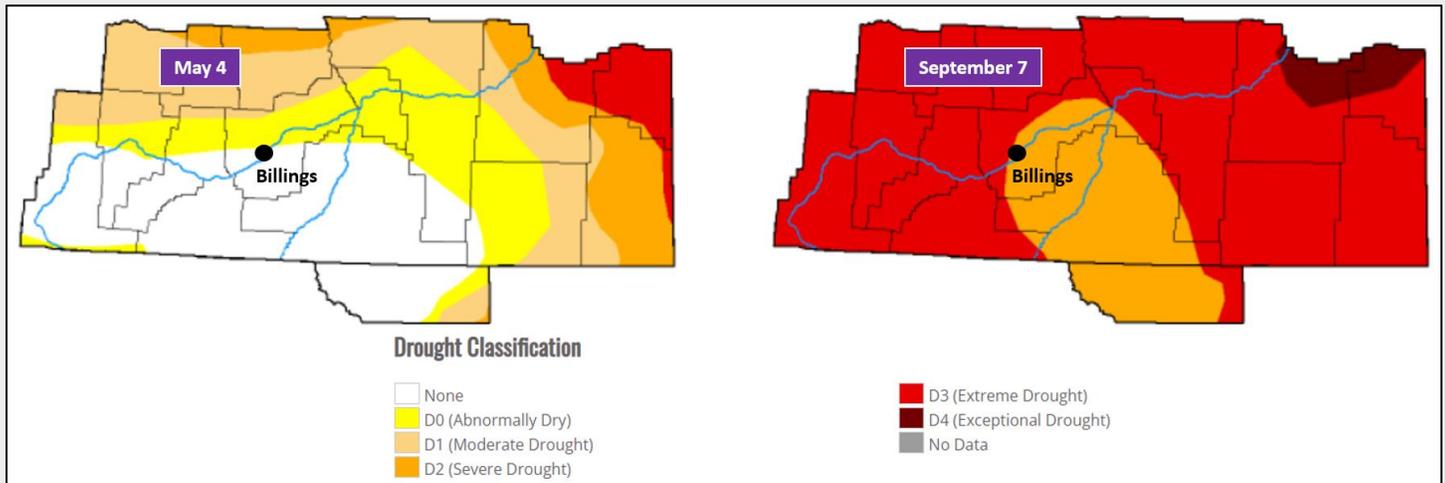
Though last winter was mostly mild, a significant cold snap affected the region in mid-February. Some locations saw temperatures reach 40° below zero, and Billings experienced highs that were below zero for seven straight days. Ingomar reported a low of -44° on February 13<sup>th</sup>.

A warm and dry spring led to a very early onset of fire season. A historically hot and windy day in mid-June (the Robertson Draw Fire near Red Lodge grew to a large fire on the 15<sup>th</sup>) kicked off a long fire season, one that persisted into October. Below 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

The persistently warm and dry weather also resulted in worsening drought conditions. The maps below show how drought classifications changed from early May to early September. Severe to exceptional drought was observed by the end of summer. Hot and dry weather impacted agriculture, ranching and recreation across the region.



The 2021 fire season would have been worse if not for a fairly wet August, but the precipitation itself did little to improve the well-established drought conditions. September was a very dry month. October and November saw precipitation closer to normal, but with continued above normal temperatures. The first three weeks of December were also warm (and quite windy), but a cold air mass finally invaded the region at the end of the month.

Below are 2021 statistics for each of our four main climate stations.

	Average Temp	Total Precipitation	Warmest Temp	Coldest Temp	Wettest Day	Peak Wind
<b>Billings</b>	49.9° + 1.7° 9 <sup>th</sup> warmest	10.13" - 4.18" 11 <sup>th</sup> driest	107° (July 19)	-22° (February 14)	0.63" (March 20 & August 3)	73 mph (July 7)
<b>Livingston</b>	47.0° + 1.5° 12 <sup>th</sup> warmest	11.62" - 2.93" 13 <sup>th</sup> driest	102° (July 19)	-28° (February 13)	0.98" (August 18)	87 mph (December 19)
<b>Miles City</b>	47.7° + 1.5° 16 <sup>th</sup> warmest	9.60" - 3.28" 17 <sup>th</sup> driest	109° (June 15)	-34° (February 14)	1.09" (October 9)	75 mph (January 13)
<b>Sheridan</b>	47.4° + 2.0° 10 <sup>th</sup> warmest	12.95" - 1.98" 33 <sup>rd</sup> driest	107° (June 15 & July 27)	-27° (February 13 & 14)	0.92" (April 26)	69 mph (April 8)

2021 saw many record high temperatures either broken or tied, as a result of several hot spells. Sheridan set or tied a whopping 20 record high temperatures, an average of nearly two per month, while not setting a single record low! The following is a list of daily records either tied or broken at our four main climate sites. Records go back to 1934 at Billings, 1937 at Miles City, 1907 at Sheridan and 1948 at Livingston.

Billings		
Record High Temps	64° on January 13	
	62° on February 2	
	73° on April 1	
	77° on April 4	
	98° on June 3	
	103° on June 14	
	105° on June 15	
	100° on July 1	
	101° on July 17	
	107° on July 19	
	98° on July 25	
	101° on July 26	
	106° on July 27	
	100° on August 16	
	86° on October 5	
	65° on December 1	
	69° on December 2	
	56° on December 14	
	Record Low Temps	-15° on February 11
		32° on May 20
31° on May 21		
31° on May 22		
-12° on December 27		
Record Precipitation	0.31" on February 5	
	0.37" on February 6	
	0.63" on March 20	
	0.40" on August 28	
	0.47" on October 11	
	0.24" on December 5	
Record Snowfall	5.2" on February 5	
	6.7" on February 6	
	3.5" on December 5	

Miles City	
Record High Temps	95° on June 3
	101° on June 14
	109° on June 15
	105° on July 3
	108° on July 27
	98° on September 18
	91° on September 27
	90° on October 5
	65° on November 28
	70° on December 1
Record Low Temps	-31° on February 12
	-28° on February 13
	-34° on February 14
	-20° on December 27
Record Precipitation	0.46" on August 21
	1.09" on October 9

Sheridan	
Record High Temps	66° on January 13
	74° on April 1
	77° on April 4
	84° on April 30
	93° on June 3
	96° on June 9
	100° on June 14
	107° on June 15
	104° on July 19
	107° on July 27
	101° on August 17
	95° on September 10
	94° on September 18
	92° on September 27
	74° on November 15
	68° on November 16
	66° on November 28
	64° on November 29
	76° on December 1
77° on December 2	
Record Low Temps	NONE
Record Precipitation	0.28" on February 5
	0.73" on October 11
	0.69" on October 12
	0.37" on December 5

Livingston		
Record High Temps	72° on April 2	
	75° on April 4	
	85° on April 30	
	93° on June 3	
	99° on June 14	
	98° on June 15	
	97° on July 1	
	102° on July 19	
	97° on July 25	
	98° on July 26	
	88° on September 27	
	84° on October 5	
	65° on November 28	
	63° on December 1	
	64° on December 2	
	Record Low Temps	-28° on February 13
		-24° on February 14
		29° on May 29
		27° on May 30
40° on July 10		
-11° on December 27		
Record Precipitation	0.21" on January 30	
	0.49" on August 2	
	0.98" on August 18	
	0.46" on October 25	
	0.16" on December 20	

The following is a chronological list of significant or noteworthy weather events that occurred across the region in 2020.

**January 13:** Severe winds impacted the region, beginning along the foothills during the previous night, then extending across the lower elevations behind a cold frontal passage during the day. Peak wind gusts in the 60s and 70s (mph) were widespread. Crazy Mountain Raws reported a peak of 93 mph. There were many impacts from the strong winds:

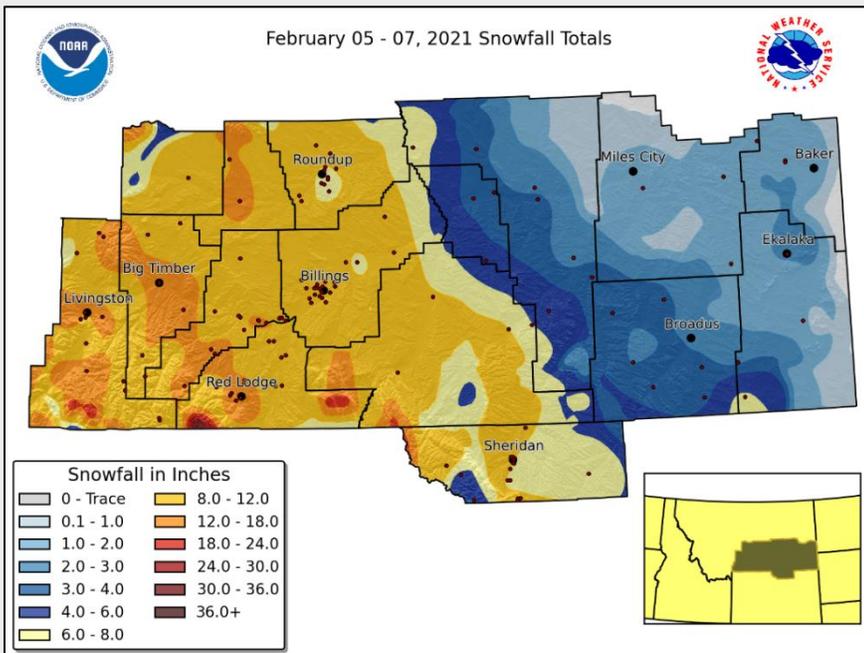
- Trees blown down
- Power lines downed
- Semis blown over
- Minor property damage
- Poor visibility in blowing dust
- Several grass fires (most notably North Delphia east of Roundup)

Peak gusts at Billings (69 mph) and Miles City (75 mph) were records for January. Billings (63°) and Sheridan (66°) also set daily temperature records.



Jan 13 – Blowing dust in Billings, viewed from rims (Anthony)

**February 7:** Moist northwest flow overrunning a building arctic air mass produced a prolonged period of accumulating snowfall, especially over the western half of our forecast area. Most locations from Roundup-Billings-Sheridan westward received between 10 and 15 inches of snow. Red Lodge picked up as much as 18", and 18" also fell a little west of Reed



Point. Portions of I-90 and US-191 were closed at times due to multi-car pileups caused by hazardous travel conditions. This snow event followed a long period (Nov-Jan) of below normal snowfall. Below is a map of snowfall totals over this 3-day period.

**February 6-14:** An extended period of very cold temperatures impacted the region. Most locations saw high temperatures stay below zero for about a week. The string of seven straight days with highs below zero at Billings tied for 3rd longest since records began in 1934, and was the longest since 1985. Baker Municipal Airport, a station with a period of record beginning in 1998, reported its overall

record cold temp with  $-34^{\circ}$ ! Some locations experienced temperatures as low as 40 below zero! The following is a summary of the coldest reported temperatures at several airport and cooperative observer stations.

**February 21-23:** A period of strong west winds impacted the region. Peak gusts: Livingston 82 mph (a February record), Big Timber 79 mph, Molt 74 mph, Judith Gap 68 mph, Rock Springs 67 mph, Billings 64 mph, Laurel 61 mph, Roscoe 60 mph, Sheridan 55 mph. Billings airport recorded peak gusts over 62 mph on consecutive days (64 mph on the 21<sup>st</sup>, 63 mph on the 22<sup>nd</sup>) for the first time on record.

**February 27:** A snow shower went through Billings between 11 am and noon, causing roads to become very slick, resulting in a 30 to 40 vehicle pile-up on the I-90 Yellowstone River Bridge. There were no fatalities, but two people

FEBRUARY: COLDEST TEMPERATURE	
Ingomar 9E	$-44^{\circ}$
Roundup 15SW	$-43^{\circ}$
Brandenberg	$-40^{\circ}$
Mizpah	$-38^{\circ}$
Hysham	$-37^{\circ}$
Springdale	$-37^{\circ}$
Baker	$-34^{\circ}$
Forsyth	$-34^{\circ}$
Miles City	$-34^{\circ}$
Broadus	$-32^{\circ}$
Hardin	$-32^{\circ}$
Columbus	$-30^{\circ}$
Bridger	$-29^{\circ}$
Livingston	$-28^{\circ}$
Billings NWS	$-27^{\circ}$
Sheridan	$-27^{\circ}$
Billings Airport	$-22^{\circ}$

were seriously injured when they were knocked off the bridge.



**March 15-16:** Low pressure ejecting from the central Rockies brought heavy snow to Story, WY on the east side of the Bighorns...picking up 14-18 inches of snow. Sheridan and Big Horn received 4-6 inches.

**March 20:** A much-needed day of rain impacted some of the region. Western and central parts south of the Musselshell River received between 0.30 and 0.80 inches of rain. Unfortunately the east and north largely missed out, picking up less than a tenth of an inch.

**March 23-24:** Unstable northwest flow produced heavy snow in and around Red Lodge and other upslope areas. Mystic Lake, Red Lodge and Story picked up 7-8 inches of snow, but up to 2 feet fell on Red Lodge Mountain.

**March 29:** Strong winds impacted the region, especially along the foothills (and not just in the usual spots). Many locations had gusts between 50-70 mph. A site near Pine Creek in the Paradise Valley reported a peak gust of 71 mph. A 70 mph gust was observed near Red Lodge, and 68 mph at Roscoe, resulting in power outages in the area. Strong winds spread east in the afternoon, and Miles City reported a peak gust of 66 mph.

**April 18-20:** Accumulating wet snowfall impacted much of the region, with greatest amounts along the western/southern mountains and foothills. Some totals included: Story area 15-21", Big Horn 12", Sheridan area 6-12", Red Lodge area 6-11", Big Timber 8", Reed Point 6", Fort Smith 5", Billings area 2-5", Joliet & Ryegate 4".

**May 20-21:** Wet snow fell over parts of the western foothills. Eight inches fell just west of Melville, with about 4" at Livingston and Wilsall, and 3" at Big Timber. Red Lodge picked up an inch.

**May 28:** The first severe thunderstorm of the season produced half dollar to ping pong ball size hail in Edgar. There were other severe weather reports further east, including 1.25" hail and some car and house damage in Fort Smith, up to golf ball size hail near Broadus (and 1" hail in town), and a 61 mph wind gust south of Biddle near the WY state line.

**June 4:** A thunderstorm microburst produced a 74 mph wind gust near Crow Agency. A few other severe reports included: a 62 mph wind gust over Arrow Creek Hill, 1" hail at Wilsall, and golf ball size hail southwest of Twodot.



**June 5:** A line of severe thunderstorms produced strong winds at Rock Springs (62 mph), Miles City (60 mph) and Baker (67 mph).

**June 10:** An active day of weather with several components, including severe weather, red flag conditions, and downslope winds along the foothills. SEVERE WEATHER: golf ball size hail south of Roundup, 1" hail near Columbus, 2" hail at Shepherd, 1" hail on the west side of Billings, 2.5" hail near Angela. RED FLAG: Eastern areas were 100° or hotter, with low RH. Mizpah reached 106°, Baker 105° (7% RH), Broadus 104°, Ekalaka 102° (6% RH), and Miles City 100° (13% RH). Fort Howes Raws was 100° with 5% RH and winds gusting to 39 mph. FOOTHILLS WINDS: Gusts of 60-70 mph, including peaks of 70 mph at Fishtail, 67 mph at Livingston & Big Timber, 61 mph at Melville, and 60 mph at Roscoe Hill. Wind damage occurred in Red Lodge, with power lines downed, tree fallen on car, tree damage in nearby campground.

**June 15:** VERY HOT! Sheridan tied its all-time record with 107°. Brandenburg hit 111°, Miles City 109°, Billings 105° (108° at the NWS office). In addition to the heat it was very dry and windy, with RHs widespread in the single digits and



wind gusts of 35-45 mph along the western foothills. The Robertson Draw Fire just south of Red Lodge (originated on June 13) became plume dominated and grew to over 20,000 acres. Evacuation orders came in effect for some residences and camp grounds in the area (including the town of Bearcreek). Photo below is taken from Red Lodge on June 15.

**July 2:** A severe thunderstorm produced a 70 mph wind gust 12 miles south of Ridgeway.

**July 6:** Severe weather reports included: 1.25" hail at Lavina, 1" hail just northwest of Shepherd, 1" hail at Huntley, 1.75" hail 13WSW of Hysham, 1.75" hail and windows broken 9SSE of Big Horn, 1.75" hail 24E of Hardin, 1" hail 25SSE Hysham and near Busby and Birney, 1.25" hail at Ranchester.

**July 7:** A few thunderstorms produced severe wind gusts, including 68 mph 10E of Molt, 64 mph at Forsyth, 73 mph at the Billings airport, 59 mph at Judith Gap, 60 mph at Big Timber, tree damage near Miles City, and a whopping 82 mph 18SSW of Mizpah.

**July 16:** A severe thunderstorm produced a 63 mph wind gust at the Big Timber airport. Another storm caused damage to a camper, mobile home and power lines (which started a grass fire) just south of Huntley.

**July 19:** Another very hot day! Most of the region saw temps over 100 degrees. Billings NWS reached 111°, the hottest temperature measured at our office since records began in 1999. The Billings airport climbed to 107°, falling one degree short of the all-time record. Elsewhere, Huntley reached 108°, Bridger 106°, Miles City 106°, Livingston 102° and Red Lodge 96°.

**July 20:** A severe thunderstorm produced 1" hail and 60 mph wind gusts 20NNE of Baker. Some house windows were broken.



**July 22:** A severe thunderstorm produced a 73 mph wind gust near Alzada.

**July 27:** Yet another VERY HOT day. Sheridan (107°) tied their all-time record for the 2<sup>nd</sup> time this summer (also on June 15). Other highs: Biddle 8SW 110°, Mizpah 109°, Brandenburg 108°, Miles City 108°, Ridgeway/Baker 107°, Billings/Ekalaka 106°.

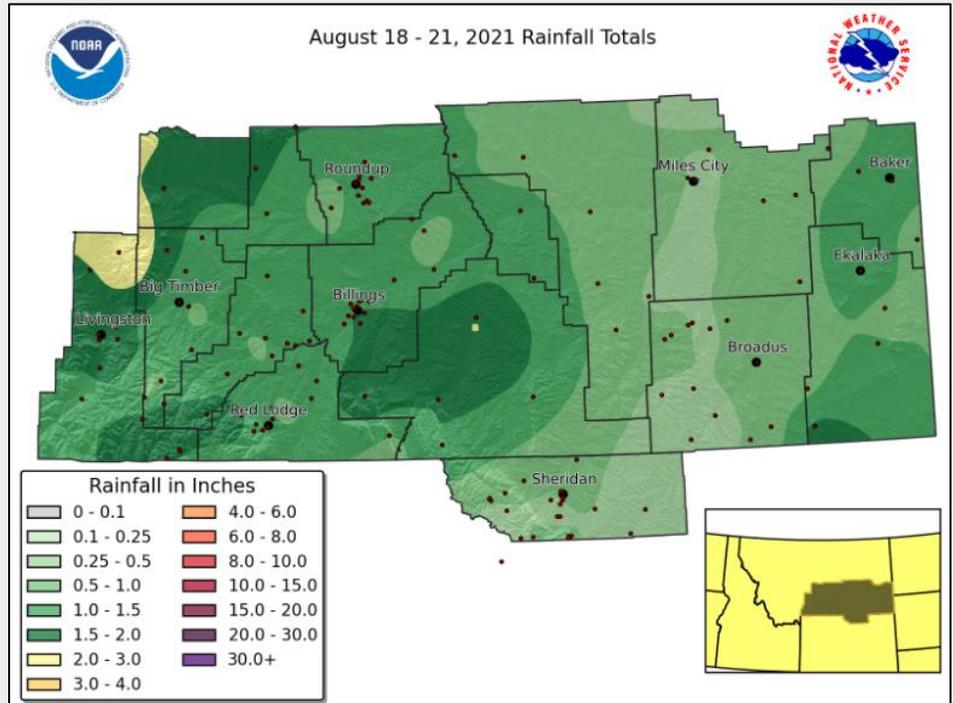
**August 8:** Strong winds associated with a fall-like cold front impacted the region. Some of the winds were assisted by thunderstorm activity that developed along the front. A couple of new fires grew, including Trout Creek near Absarokee and Richard Spring near Colstrip. There were

evacuations associated with Trout Creek, including homes along the Stillwater River. Peak gusts included: Miles City 65

mph, Sheridan 64 mph, Livingston 62 mph, and Ingomar 60 mph. Miles City reached 101° (15<sup>th</sup> time this summer with a high of at least 100°).

**August 18-21:** A remarkably cool & wet weather system for the time of year impacted the region. Many locations received over an inch of rain (the exception being Forsyth-Miles City-Broadus-Sheridan where amounts were mostly 0.50-1.00"). A mesonet over the Crazy Mountains picked up 3.10 inches of rain! On the morning of the 21<sup>st</sup>, snow fell over the high peaks of the Beartooth/Absarokas.

**August 1-31:** Quite unexpectedly, Livingston had its 2<sup>nd</sup> wettest August on record, and Billings its 3<sup>rd</sup> wettest. Wildfire activity quieted down due to the wet month, and some areas saw grasses become green.



**September 13:** A late season severe thunderstorm produced quarter size hail near Ranchester.

**October 11-13:** A slow-moving storm system (closed low) moving through the central Rockies and lifting up the high plains brought widespread precipitation and areas of heavy snow. Heaviest snow was along the foothills and in the east (over a foot w/ wind and drifting). Amounts included: Mystic Lake 27", Story area 18-22", Ridge 19", Red Lodge 18", Volborg 18SW 17", Ekalaka 17", Big Horn 14-16", Biddle 12", Livingston area 9-12", Big Timber 9", Billings 3-6" (more to the south). Sheridan set daily precipitation records on the 11<sup>th</sup> (0.73") and 12<sup>th</sup> (0.69").



**November 16:** Strong pre-frontal SW winds impacted the lee side of the mountains, courtesy of mountain waves, followed by strong post-frontal W-NW winds across lower elevations.

Strongest winds and significant wind damage occurred in the Red Lodge and Story areas during the night of the 15<sup>th</sup>. Peak gusts included: 96 mph near Story and 81 mph near Red Lodge (Bearcreek & Luther). Estimates put Nye at peak gusts near 90 mph. Also, during the night of the 15<sup>th</sup>, the Rosebud Fire (near West Rosebud) burned an estimated 1050 acres and resulted in resident evacuations. Behind the front on the 16<sup>th</sup>, winds gusted mostly in the 50s and 60s across the lower elevations. The Billings airport reported a peak gust of 70 mph. A few other notes:

- Several homes damaged due to fallen trees and roofs being blown off
- I-90 was closed in Sheridan county due to the strong winds
- Elk Basin Fire near Belfry (small fire, 3 acres)
- Power Line Fire (between Judith Gap and Harlowton), 242 acres

- A few power outages in the Billings area

**December 1:** Strong winds impacted the western foothills. Livingston airport observed a peak wind gust of 85 mph. Big Timber, Harlowton, Judith Gap, Rapelje and Molt all reported peak gusts between 58-66 mph.

**December 1-2:** Meteorological winter started off with two very warm days. Most of the region saw highs in the 60s to mid-70s, and Billings, Miles City & Sheridan each set daily record highs each day. Sheridan reached 76° on the 1<sup>st</sup> and 77° on the 2<sup>nd</sup>, the latter of which tied the all-time record for December (76° is now 3<sup>rd</sup> warmest). Other max temps included: Dayton 76°, Broadus 74°, Hardin 72°, Columbus 70°, Forsyth 70°, Miles City 70°, Billings 69°.



Nov 16 – House damage in Story (Ivory)

**December 5:** A clipper system produced fairly widespread snow for west & central parts, with greatest amounts over the southern foothills. The Red Lodge area picked up 12-16” of snow, Edgar 8.5”, Big Horn 7”, Rockvale 6”, Park City 6”, Absarokee 5”, Sheridan 5”, Billings area 3-6” during the early morning of the 5<sup>th</sup>.

**December 11-12:** Another period of strong winds for the western foothills. Livingston airport had a peak gust of 78 mph. Areas south of Reed Point and Columbus had peak gusts of 62-72 mph. Other peak gusts: Big Timber 61 mph, Harlowton 61 mph, Judith Gap 58 mph.



Dec 14 – Icy conditions on I-90 near Reed Point (DOT)

**December 14-15:** A weather system brought widespread snow with most locations seeing 2-5” of accumulation, but there were higher totals near the foothills. Other amounts included: Joliet 8WNW 8.5”, Columbus 8”, Red Lodge area 6-9”.

**December 25:** With a 5am snow depth of one inch, Billings had its first white Christmas since 2017.

**December 26-31:** A cold snap affected the region to end the year. Most locations saw below zero low

temperatures, and some below zero highs were observed.

**Have a great 2022 everyone!!**