

2022 Weather in Review



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.

Annual average temperatures and total precipitation across the region in 2022 were largely unremarkable, but it was a year of extremes...with periods of record heat, record cold, heavy rain and record flooding. Several high impact weather events will be remembered.

The year began with quiet weather, and lingering drought conditions from the warm & dry 2021. Back-to-back blizzards affected southeast Montana and northern Wyoming about 10 days apart in April. Wet weather in spring and early summer improved the drought in much of our region. Over Memorial Day weekend, heavy precipitation (rain and high elevation snow) fell over the Beartooth-Absaroka Mountains and nearby foothills. This was followed by more heavy rain in mid-June, which along with rapid high elevation snow melt resulted in historic flooding on rivers and streams emerging from the Beartooth-Absarokas.

Due to the precipitation and strong green up, we had an active severe weather season in 2022. A few noteworthy severe episodes included very strong winds and crop damage near Hardin on June 11, long duration nocturnal severe thunderstorms (with large hail) during the early morning of July 5, a gust front-driven blowing dust incident on I-90 just west of Hardin on July 15, and a severe storm that produced some accumulating hail in the Billings area on July 24.

The 2022 wildfire season was for the most part quiet, but it did become active briefly in the late summer. The first week of September saw record-breaking heat and multiple 100° days across the region. Wetter weather returned for the fall.

November and December saw persistent cold and overall well below normal temperatures. Blizzard conditions impacted southeast Montana and Sheridan County in the middle of December. This was followed by a surge of very cold air (with bitterly cold wind chills) during the week leading up to Christmas.

Below are 2022 statistics for each of our four main climate stations.

	Average Temp	Total Precipitation	Warmest Temp	Coldest Temp	Wettest Day	Peak Wind
Billings	47.5° - 0.7° 41 st coldest	15.28" + 0.97" 33 rd wettest	103° (July 17)	-25° (December 21)	1.50" (July 24)	69 mph (July 24)
Livingston	45.4° - 0.1° 36 th coldest	14.13" - 0.42" 31 st driest	102° (Sept 3,7)	-27° (February 23)	0.98" (October 22)	75 mph (December 27)
Miles City	45.3° - 0.9° 30 th coldest	9.75" - 3.13" 17 th driest	106° (July 17)	-29° (January 1 & December 23)	0.67" (October 23)	68 mph (August 14)
Sheridan	45.5° + 0.1 44 th warmest	15.48" + 0.55" 53 rd wettest	104° (July 17-18, Aug 10 & Sept 7)	-23° (February 23 & Dec 22,23)	2.39" (May 30)	66 mph (April 6)

2022 saw far less record highs than in 2021, and overall, daily records were generally fewer than recent years. 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 Records	
Record High Temps	103° on July 17
	101° on September 3
	100° on September 4
	102° on September 7
Record Low Temps	-16° on February 22
	-21° on February 23
	9° on April 13
	4° on April 14
	10° on April 15
	15° on April 16
	32° on May 20
Record Precipitation	0.60" on April 29
	0.31" on July 15
	1.50" on July 24
	0.54" on September 30
Record Snowfall	6.0" on February 20
	3.1" on February 21
	13.9" on April 12

Miles City Records	
Record High Temps	59° on February 7
	106° on July 17
	105° on August 4
	105° on September 7
Record Low Temps	-24° on February 23
	11° on April 16
	28° on May 22
	-17° on November 11
	-7° on November 18
Record Precipitation	0.67" on October 23

Sheridan Records	
Record High Temps	104° on July 17
	104° on July 18
	101° on August 4
	101° on September 3
	104° on September 7
Record Low Temps	-23° on February 23
	6° on April 14
	10° on April 16
	-7° on November 18
Record Precipitation	0.35" on March 4
	2.39" on May 30
	1.24" on September 8
	0.60" on September 9
	0.60" on December 13

Livingston Records	
Record High Temps	74° on March 28
	101° on July 17
	96° on September 1
	102° on September 3
	95° on September 6
	102° on September 7
	89° on September 28
Record Low Temps	-14° on January 1
	-22° on February 22
	-27° on February 23
	-12° on March 10
	7° on April 14
	8° on April 15
	24° on May 21
	33° on June 25
	27° on September 10
-5° on November 18	
Record Precipitation	0.52" on May 3
	0.98" on October 22

The following is a chronological list of significant or noteworthy weather events that occurred across the region in 2022.

January 5: A cold day! Miles City (-9°) and Livingston (-3°) each set a daily record cold max temperature. Other highs: Baker -12°, Forsyth -8°, Sheridan -5° and Billings -4°.

January 6-7: A weather system produced accumulating snow across the west half of the forecast area. Most areas received 2-4", but Big Timber to Livingston saw 4-8". An observer 11N of Big Timber reported as much as 10". Fisher Creek Snotel near Cooke City received 22".

January 20-21: A period of freezing rain produced very difficult travel conditions and numerous accidents on I-94 from the Hysham area eastward. I-94 closed for several hours (from 12:15 am into the following morning past sunrise) from Miles City to the ND state line. The Miles City airport received 0.08" of rain with temps in the lower 30s.



Jan 21: Freezing rain in Miles City (Big Sky Weather)

February 11: Red Lodge Mountain received up to 30" of snow, with 10-20" in the Red Lodge area, due to very unstable northerly flow.

February 16: Heavy snow fell along the foothills: Luther to Red Lodge 8-12", Dayton 11", Story area 8-11".

February 20-21: Much-needed widespread snow impacted the region, followed by cold temperatures. A west-to-east area from Livingston to Billings, Colstrip and Ekalaka received 6-12". Some totals: 12" of snow 25 miles north of Broadus, 10" at Hysham 8E and McLeod, 8-12" in the Billings area, 6-10" in the Ekalaka area, 9" at Pine Creek.

February 21-24: A brief but significant cold snap impacted the region. Many locations stayed below zero for high temps on the 22nd and 23rd, and there were some daily records broken. Low temps included: Brandenburg -36°, Busby -34°, Ingomar -32°, Ridgeway -30°, Columbus & Hardin -29°, Broadus -28°, Baker & Livingston -27°, Sheridan -23°, Billings airport -21° (most of these lows occurred on the 23rd).

March 7-9: Snow impacted much of the region, and was greatest along the mountains and foothills. Mountains near Red Lodge picked up 14-19". Elsewhere, Story area 10-11", Fort Smith 7", Park City 6", Billings area 3-4", Big Timber 3".

March 28: A very warm day. Livingston tied its daily record with 74°. Sheridan (79°) and Livingston missed a March record by one degree! Other highs: Brandenburg 81°, Broadus 80°, Forsyth 79°, Busby 78° and Billings 77°.



Feb 23: Light Pillars at Billings (Behringer)

April 5: Strong westerly winds impacted the region with widespread 50-60 mph gusts. Peak gusts included: 67 mph near Molt and Reed Point, 66 mph near Big Timber, 64 mph at Ingomar, 62 mph at Livingston and Miles City, and 60 mph near Melville.

April 11-16: Widespread significant snowfall impacted the region, with strong winds and blizzard conditions in the east, followed by record cold for mid-April. SNOW: Most locations (except the Paradise and Shield River valleys) received 8-

15", while some areas east of Billings saw up to 20" and the Beartooth/Red Lodge Foothills two feet. Billings picked up 10-12" of snow between 6am and noon on the 12th. Billings' snow depth of 13" on the morning of the 13th was the greatest depth on record so late in the spring.

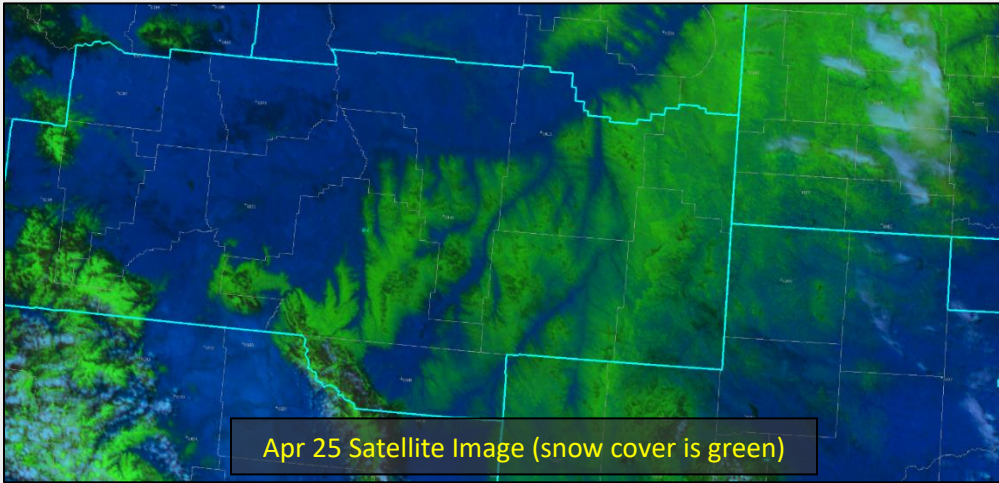
WIND/IMPACTS: Significant blowing and drifting snow resulted in lost livestock, school closures, and many road closures. The following highways were closed for significant periods of time: I-94 east of Billings, US-212 Crow Agency to Alzada, US-12 Miles City to ND state line, MT-59 from Miles City to WY state line, MT-7 Baker to Ekalaka, and S-323 Ekalaka to Alzada. RECORD COLD: Many daily record low and cold high temperatures were set



Apr 14: Plowing Hwy 7 south of Baker (Fallon County DES)

from the 13-16th. Some locations even fell below zero, including Melville (-10°), Springdale (-7°), Columbus (-6°) and Red Lodge (-4°).

April 22-24: Another very intense (but warmer) storm system brought widespread rain and wet snow, and blizzard conditions to southeast MT and north central WY. In southeast Montana, especially over the higher hills south of I-94, snowfall of 10-18" was reported. Some locations received up to two inches of water equivalent. The combination of



snow and wind gusts of 45-55 mph produced widespread blowing and drifting snow, and closed several highways for the 2nd time in less than two weeks. Closures included: I-90 through Sheridan County, US-212 from Crow Agency to Alzada, US-12 from Miles City to the ND state line, MT-59 from Miles City to the WY state line, MT-7 from Baker to Ekalaka, and S-323 from Ekalaka to Alzada. Similar to the previous storm, it took a few days to

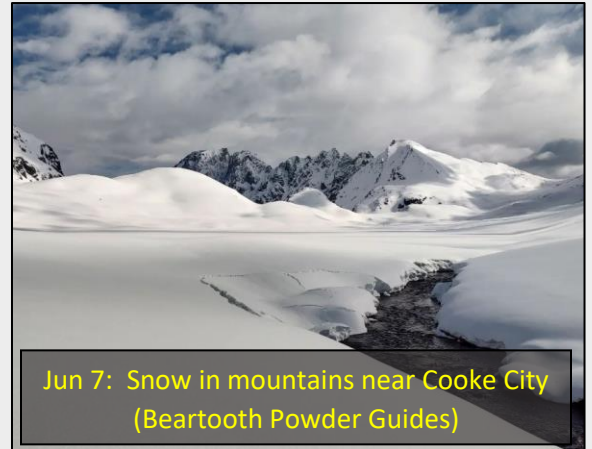
reopen S-323. Above is a satellite image from the 25th showing snow cover in green (river valleys such as the Tongue and Powder River can be seen clearly).

May 16: The first severe thunderstorms of the season produced localized damaging winds: estimated 70 mph wind gust and damage to lawn furniture in Livingston, tree and roof damage in Lavina. Both occurred in the late afternoon.

May 19: Cold front produced strong winds across the region, with some gusts exceeding 60 mph. Peak winds included: 67 mph in rural northern Rosebud County, 65 mph at Rock Springs and Huntley, 63 mph near Big Timber and Columbus, 62 mph near Reed Point.

May 28-31: Widespread precipitation occurred, especially over the mountains and along the foothills. Precipitation of 3-5" was common in upslope areas of the Beartooth-Absarokas, Pryors and Bighorns. Luther received a whopping 5.80" of rain. Much less rain fell from Roundup to Miles City and Baker. Mountains saw heavy wet snow with estimates of 3 to 5 feet above 8000 feet, and snow levels dropped briefly as low as 6000 feet. The Beartooth Highway saw heavy snowfall and significant drifting, and was closed for nearly 2 weeks before reopening. By June 1st, Placer Basin Snotel south of Big Timber at 8830 feet had more SWE (21.7") than at any point during the winter and spring.

June 6: A severe thunderstorm produced up to golf ball size hail at Ranchester. This was the first severe hail report of the season.



June 11: A severe thunderstorm produced very strong damaging straight-line winds in the Hardin area. The airport clocked a wind gust of 84 mph before data went missing due to a power outage. Stronger wind gusts up to 115 mph were estimated (from observed damage) north of I-90. Many power poles were snapped, metal sign posts were bent nearly to the ground, some metal roofing was removed from buildings, trees were snapped and uprooted, and crop damage occurred due to wind-blown hail.



June 12-15: HISTORIC FLOODING! The combination heavy precipitation (0.8 inches to over five inches of rain) and 2-5 inches of mountain snow-water equivalent melt from the 10th through the 13th led to unprecedented flooding across the Absaroka and Beartooth Mountains and adjoining foothills. The impacts were too many to list, and included:

- Rock Creek flooded Red Lodge and washed out the Beartooth Highway south of the town.
- Road to East Rosebud Lake experienced a total wash out.
- Nye Road at Stillwater Mine washed out.
- 68 people at Woodbine Campground were stranded, and rescued via raft.
- Main Boulder Road south of McLeod closed.
- Carbella Bridge in the Paradise Valley washed out.
- Gardiner to Mammoth highway closed due to several washouts (thus closing the north entrance to Yellowstone NP).
- 3 bridges on Soda Butte Creek near Cooke City washed out.
- Water plant in Billings forced to shut down for a day due to record stage on the Yellowstone River.



Many rivers recorded new record stages during this flood event. Below is a summary.

River Gauge Location	Peak Observed Stage	Previous Record
Yellowstone River at Corwin Springs	13.88 feet	11.5 feet
Yellowstone River at Livingston	11.63 feet	10.7 feet
Stillwater River near Absarokee	10 feet	7.2 feet
Clarks Fork near Belfry	12.93 feet	10.0 feet
Clarks Fork at Edgar	12.98 feet	9.5 feet
Yellowstone River at Billings	16.5 feet	15.0 feet

June 19: A severe thunderstorm produced 2.5" diameter hail near Alzada.

June 20: A severe thunderstorm caused wind damage near Ashland: several large trees downed and half a roof taken off a house trailer. Lots of small hail.

July 3: Heavy rain from thunderstorms produced street and low land flooding in Baker. The Baker airport measured 2.17 inches of rain. There was also a report of hail up to the size of quarters.

July 5: The night and early morning hours had an abundance of severe weather. A nighttime severe thunderstorm produced large hail just north and east of Billings around 230am. Up to 2" hail was reported at Shepherd and Huntley. Another storm produced an 87 mph wind gust 13 miles northeast of Baker at Cannonball Creek Raws at 325am. Hail of 1.25" diameter was reported at Colstrip at 449am, and golf ball sized near Mill Iron at 5am. These storms also produced localized very heavy rain. One station northwest of Roundup measured 2.07" during the night.

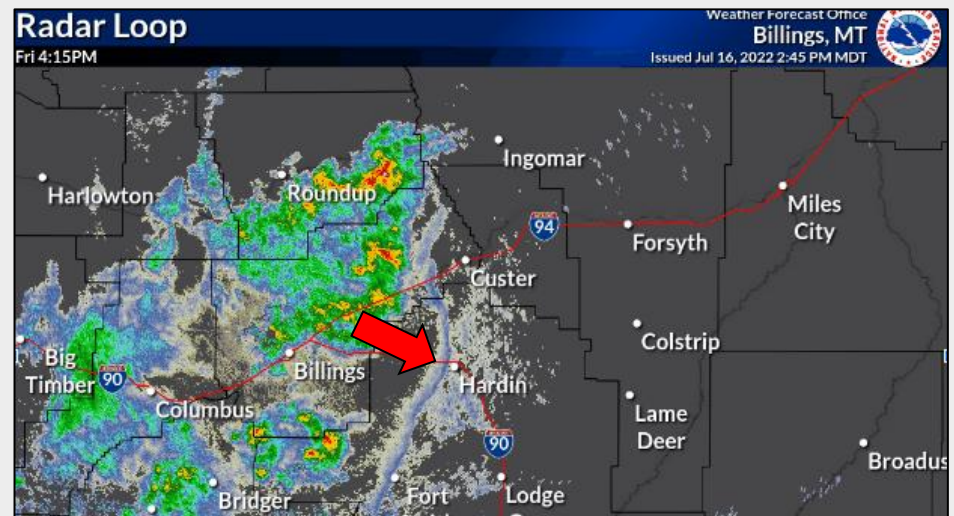


July 9: Severe weather occurred during the evening. Golf ball sized hail north of Roundup and at Melstone, and 2" hail fell near Musselshell. A bit later in the evening, 2" hail fell 20 miles northwest of Miles City in rural Rosebud County. There was also wind damage (downed tree branches) near Kinsey. Outflow from thunderstorms produced a 61 mph gust at Sheridan.

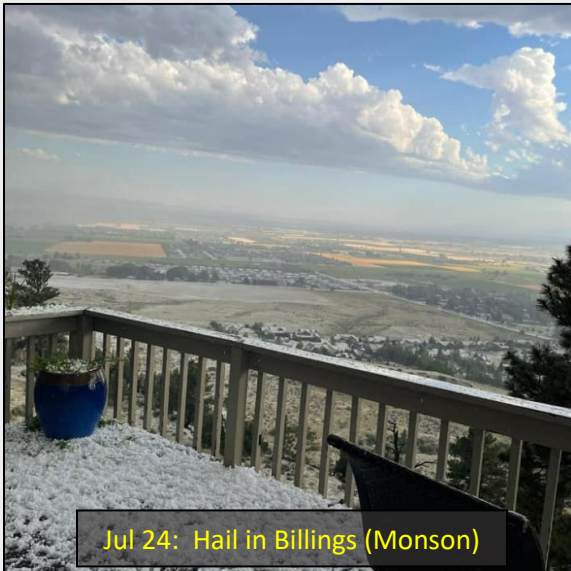
July 10: A severe thunderstorm produced a 78 mph wind gust near Alzada during the evening. No damage was reported.

July 14: A severe thunderstorm produced a 68 mph wind gust near Otter (southwest of Broadus) during the evening.

July 15: Severe thunderstorms produced strong winds at several locations, but the most significant event was a dust storm that produced near zero visibility and caused a major pileup (21 vehicles) on I-90 just west of Hardin around 430pm. There were six fatalities and at least eight others transported to area hospitals. The Hardin airport recorded a peak gust of 64 mph, while an observer w/ a handheld Kestrel anemometer recorded a peak gust of 76 mph just five miles north of the pileup. The blowing dust is believed to have originated from recently plowed fields nearby, due to crop losses from the June 11 severe storms in the same area. Other severe weather included: 67 mph gust east of Warren, 65 mph at Ingomar and near Angela, 64 mph near Billings, Rock Springs & Forsyth, 60 mph near Two Dot, and golf ball hail at Laurel. To the right is a radar image showing the gust front that caused the strong winds and blowing dust near Hardin.



July 18: A severe thunderstorm wind gust of 63 mph was reported a few miles south of Lockwood at 135am.



July 24: A severe thunderstorm impacted Billings with hail, strong winds and torrential rainfall during the early evening. Hail ranging from quarter to ping pong ball size was reported, the airport measured a peak wind gust of 69 mph, and the heavy rain caused street flooding.

August 6: A remarkably cool & wet day for early August, with a Canadian air mass being overrun with deep monsoon moisture. Most places saw afternoon temps in the 50s to lower 60s. Billings (66°) and Livingston (61°) set record cold highs for the day, while Miles City (70°) tied its record. The northern Bighorns, on the MT side, received 2.26" of rain (Bighorn Raws).

September 1-7: The hottest first week of September on record in our region, with widespread 90s and multiple days of reaching 100° for most locations. On the 7th, Billings (102°), Livingston (102°) and Sheridan (104°) had their latest 100-degree day on record. Crow

Agency hit a whopping 108° on the 7th, while it was 106° at Broadus and Brandenburg. Even Red Lodge reached 93°.

September 8-9: Wet weather impacted Sheridan County behind a cold frontal passage. Sheridan broke consecutive daily precip records, and had a 2-day total of 1.84". Big Horn received 1.87" of rain, Dayton 1.68" and Story 1.35". The high elevations of the Bighorn Mountains picked up some snow above 8000 feet, especially the highest peaks south of Burgess Junction (i.e. the Cloud Peak area).

September 30 – October 3: A slow-moving weather system brought lower elevation rain and a little high elevation snow to the region. Heaviest precipitation was in Wheatland County and northern Sweet Grass County, where Harlowton saw 3.28" of rain and Melville 3.35". Most other areas saw between 0.50" and 1.50" of rain over this 4-day period. This was a seasonably warm system and snow levels remained high.

October 21-23: Widespread precipitation impacted the region, with mountain snow and lower elevation rain/snow. This was the first lower elevation snow for many locations. Heaviest precipitation was in Park County...around 2 ½ inches was measured near Cooke City and in the Crazy Mountains northeast of Wilsall. The Livingston airport picked up 1.24" (including a daily record 0.98" on the 22nd). Most other areas saw a half inch or less. Regarding snowfall, most locations saw an inch or less but there were locally higher totals, including: up to 12" in the Wolf Mountains east of Lodge Grass, Story 7", Ekalaka 6.5", Dayton 4", Plevna 3.6", 3.5" in the higher terrain northwest of Broadus, and Alzada 2.5". Highway 191 was closed for a time from Harlowton to Eddie's Corner. At high elevations, up to 21" of snow fell in the Crazy Mountains, and 11" fell near Cooke City and at Burgess Junction.

November 4-5: Strong pre-frontal winds occurred along the foothills, followed by strong post-frontal winds across lower elevations. Peak gusts included: Judith Gap 75 mph, Harlowton 74 mph, Livingston airport 69 mph, Angela 67 mph, Molt 67 mph, Roscoe 66 mph, Roundup 11NE 65 mph, Rapelje 65 mph, Big Timber 64 mph, Miles City airport 64 mph, Laurel 64 mph, Fishtail 62 mph, Billings airport 58 mph.

November 7-10: A cold Canadian air mass arrived and was accompanied by periods of snow across the region. **SNOW:** Greatest overall snowfall at lower elevations was in central parts of our forecast area, from Musselshell-Yellowstone eastward to Rosebud County. Gardiner picked up 17" over the 4-day period. Other amounts: Dayton 15", Melstone 5.7E 15", Livingston area 10-13", Roundup 12", Billings area 7-11", Sheridan area 6-10", Hardin & Fort Smith 8", far southeast MT saw 5-10". **TEMPS:** Not extreme, but much below normal. Livingston set a record cold high with 11° on the 9th.

November 18: Livingston (-5°), Miles City (-7°) and Sheridan (-7°) set daily record lows.

December 12-15: Snow impacted the entire region, but heaviest snow along with fairly strong NW winds impacted southeast MT and Sheridan County. Gusts of 35-45 mph caused localized blizzard conditions. In Sheridan County, I-90 and US-14 were closed for a time. US-212 from Crow Agency to Alzada closed for nearly 24 hours. Other smaller roads in southeast MT were closed as well. Areas along and east of a Sheridan-Miles City line received 10-22" of snow. Reports included: Ekalaka 21.8", Plevna 20.8", Broadus 19NNW 20.4", Story 18", Ridge 17.5", Baker 15", Sheridan area 10-15", Ashland 11".

December 19-23: A bitterly cold air mass impacted the region, with very high pressures and dangerous wind chills. Snowfall received was generally light. Gusty northwest winds (35-45 mph) caused blowing & drifting snow and areas of blizzard conditions in southeast MT (especially Fallon & Carter Counties) on the 21st and 22nd. Highway 7 was closed between Baker and Alzada. TEMPS: Many locations saw their coldest temperatures in over two decades,



Dec 14: Snow drifts near Baker (Selle)

with the 22nd being the coldest day for most locations. Melville bottomed out at a whopping -45°. Other lows included: Burgess Junction & Huntley -42°, Wilsall -38°, Hardin -36°, Red Lodge & Brandenburg -35°, Columbus & Plevna -34°, Bridger -32°, Big Timber -31°, Miles City -29°, Livingston & Billings NWS -26°, Billings airport -25°. WIND CHILLS were brutally cold on the 21st and 22nd. To the left is a summary of some of the coldest wind chills reported.

SITE	COLDEST WIND CHILL
Cannonball Creek (NE of Baker)	-61°
Ekalaka	-59°
Big Timber	-57°
Harlowton	-57°
Alzada	-56°
Baker	-56°
Broadus	-56°
Cooney Reservoir	-52°
Livingston	-52°
Crow Agency	-49°
Roundup	-49°
Billings	-48°
Miles City	-48°
Edgar	-46°
Sheridan	-46°

Have a great 2023 everyone!!