

TOP 5 WEATHER EVENTS OF 2022



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: May 28-31: Precipitation over Mountains

A moist Pacific flow directed into south central Montana and northern Wyoming produced significant precipitation over the Beartooth-Absaroka, Pryor and Bighorn Mountains over Memorial Day weekend. Total precipitation of 3 to 5 inches was common, greatest in upslope

SITE	May 28-31 Precip
Luther	5.80"
Burnt Mountain Snotel – west of Red Lodge (5880')	5.70"
Sucker Creek Snotel – west of Sheridan (8880')	5.40"
Story 2W	5.35"
East Boulder Mine Snotel – south of Big Timber (6335')	4.50"
Sheridan 16S	4.46"
Mystic Lake	4.39"
Red Lodge	4.07"
Big Horn	3.12"
Sheridan	2.59"

areas (north aspects). Luther received a whopping 5.80" of rain. Mountains saw heavy wet snow with estimates of 3 to 5 FEET of accumulation above 8000 feet, and snow levels dropped briefly as low as 6000 feet. The Beartooth Highway saw heavy snow and

significant drifting, and was closed for nearly two weeks. On June 1st, Placer Basin Snotel south of Big Timber at 8830 feet had more Snow Water Equivalent (21.7") than at any other time during the winter and spring. A truly remarkable feat so late in the season!

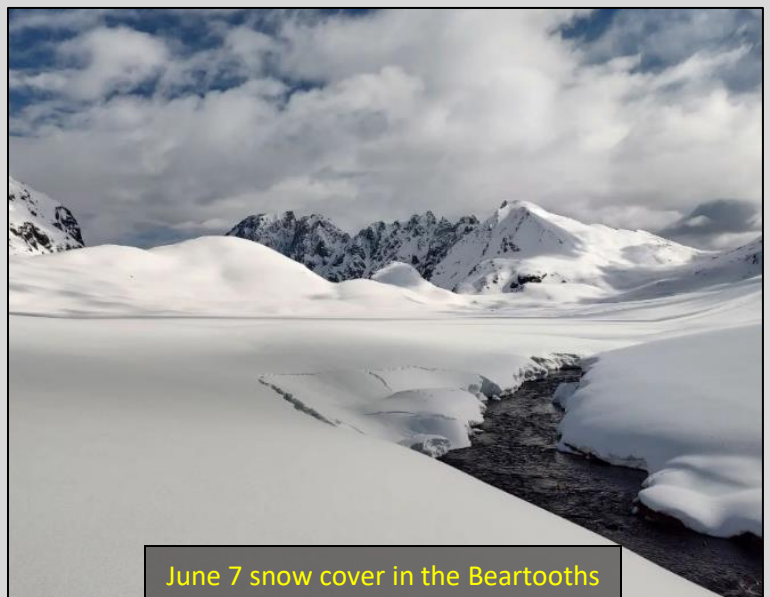
The rain caused high flows and some flooding along the foothills, including near Sheridan and Story, along Pryor Creek and Bridger Creek, and in portions



Bridger Creek Road (Sweet Grass County)

of the Stillwater River valley.

The abundance of wet isothermal snow at high elevations was a major factor in causing the historic flooding in and around the Beartooth-Absarokas in mid-June. The photo shown at right was posted by the Beartooth Powder Guides and shows the tremendous snow cover on June 7th in the mountains near Cooke City.



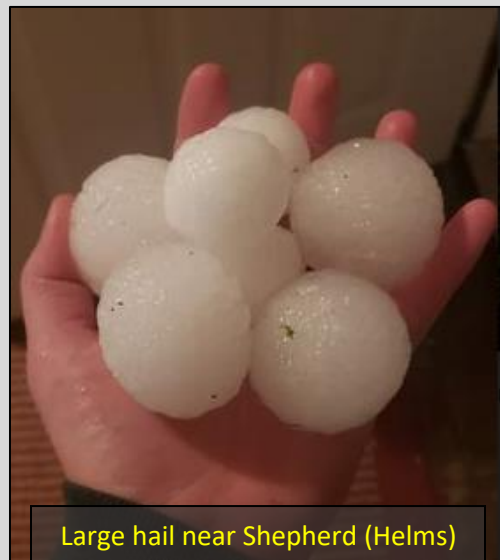
June 7 snow cover in the Beartooths

#4: July 5: Nocturnal Severe Thunderstorms

The night and early morning hours of July 5th had an abundance of severe weather, not a common occurrence in our region. One particular severe thunderstorm produced large hail just north and east of Billings around 2:30 am. Up to 2" diameter hail was reported by several people near Shepherd and Huntley, and one observer measured a hailstone the size of a tennis ball (2.75"). Another storm produced an 87 mph wind gust a few miles northeast of Baker at Cannonball Creek Raws at 3:25 am. Hail of 1.25" diameter was reported at Colstrip at 4:49 am, and golf ball sized near Mill Iron at 5 am. These storms also produced localized very heavy rain. One station northwest of Roundup measured 2.07" during the night.

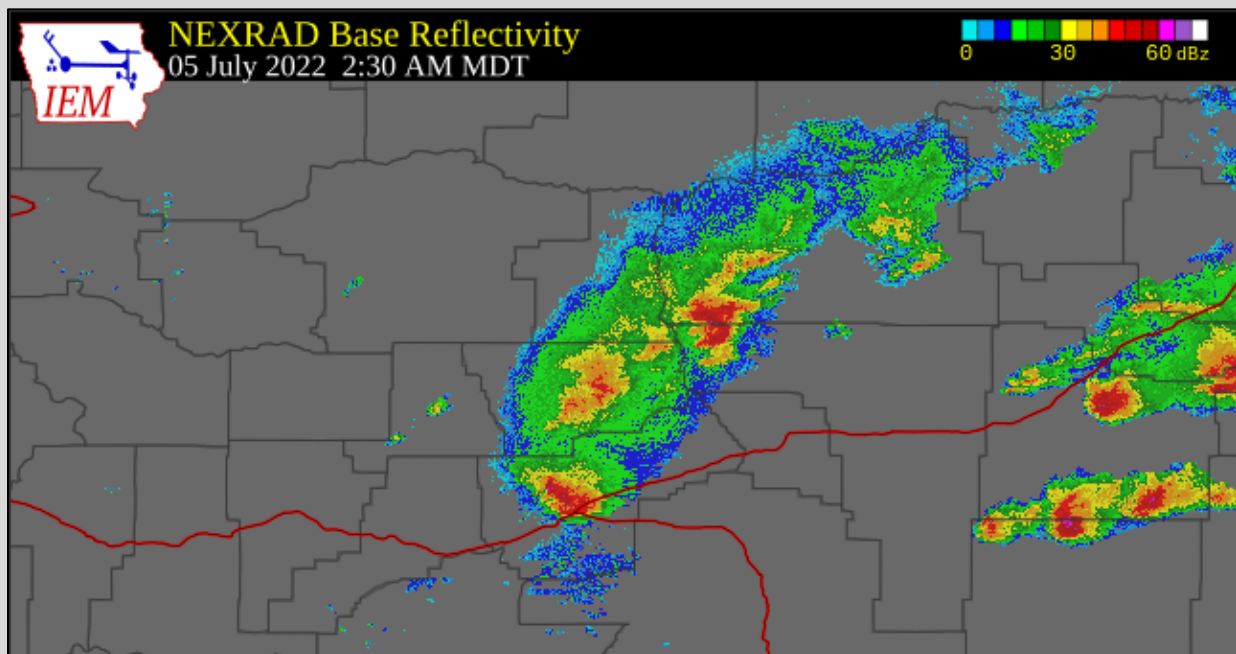


Large hail near Shepherd (Helms)



Large hail near Shepherd (Helms)

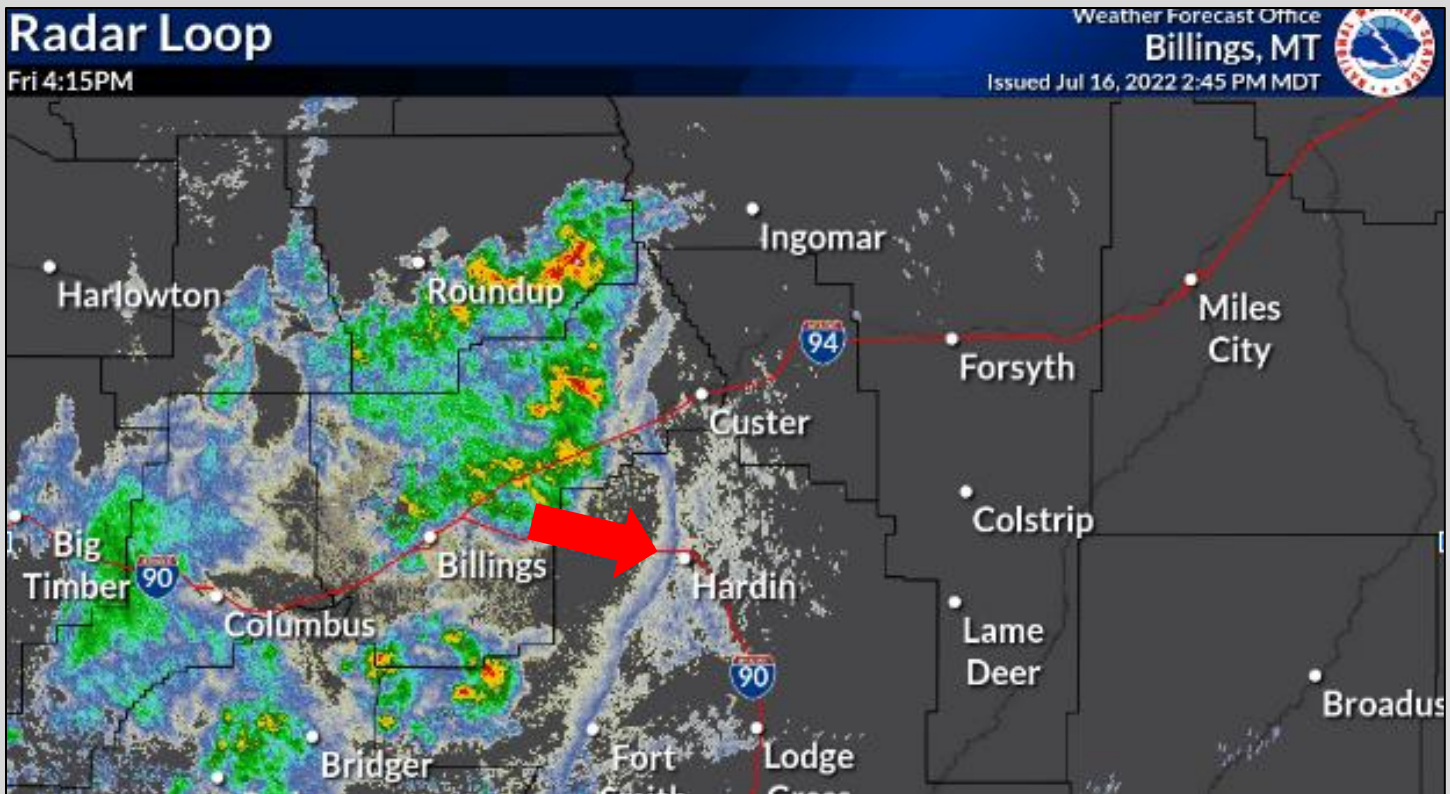
The staff at NWS Billings was very busy through the night, and still issuing warnings past sunrise. A total of 12 Severe Thunderstorm Warnings were issued between 2 and 8 am, and nine Special Weather Statements (for strong but sub-severe storms) were issued between 10 pm and 3 am. It was a night unlike any other in memory for our meteorologists.



#3: July 15: Severe Dust Storm

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 4:30 pm. 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 severe storms on June 11 in the same area. Other severe weather on this day 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. Below is a radar image showing the gust front that caused the strong winds and blowing dust near Hardin.



#2: April 11-16: Snow, Blizzard & Very Cold

Widespread significant snowfall impacted the region, with strong winds and blizzard conditions in the east, and record cold for mid-April. In almost any other year, this would be the top weather event of the year. Not in 2022.

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 or more. Mystic Lake received a total of 31", Red Lodge 26", Ekalaka 21.5", Miles City 20", McLeod 20", Columbus 17.1", Judith Gap 16", Baker 16", Billings 14.5", Ridgeway 14" and Forsyth 14".

WIND & IMPACTS: As the storm system moved into the northern plains, northwest winds gusting 40 to 55 mph caused significant blowing and drifting snow across southeast MT. The blizzard conditions resulted in lost livestock, school closures, and many road closures. The following highways were closed for significant periods of time:

- I-94 from Billings to the North Dakota state line (and further east)
- US-212 from Crow Agency to Alzada
- US-12 from Miles City to the North Dakota state line
- MT-59 from Miles City through Broadus to the Wyoming state line
- MT-7 from Baker to Ekalaka
- S-323 from Ekalaka to Alzada

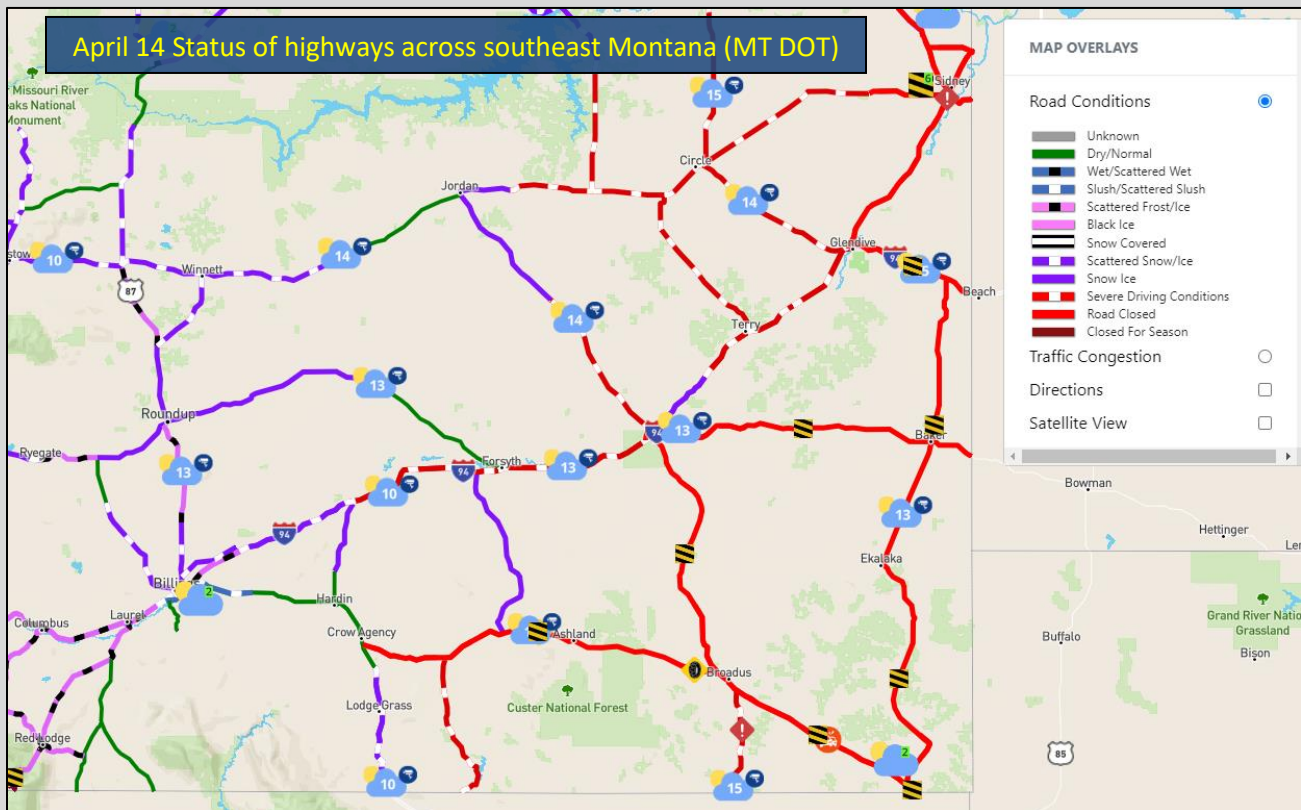
BILLINGS: Snowfall during the morning of April 12th was particularly heavy in the city of Billings. Snowfall rates of 2-3"/hour were observed, and snow piled up quickly. Approximately 10-12" fell between 6 am and noon. Total snowfall at the Billings Airport on the 12th was a whopping 13.9". This was the heaviest single day total in April since 1955, and the 6th greatest single day total on record (for any time of year). Additionally, the snow depth of 13" observed at the airport on the morning of the 13th was the greatest depth on record so late in the spring.



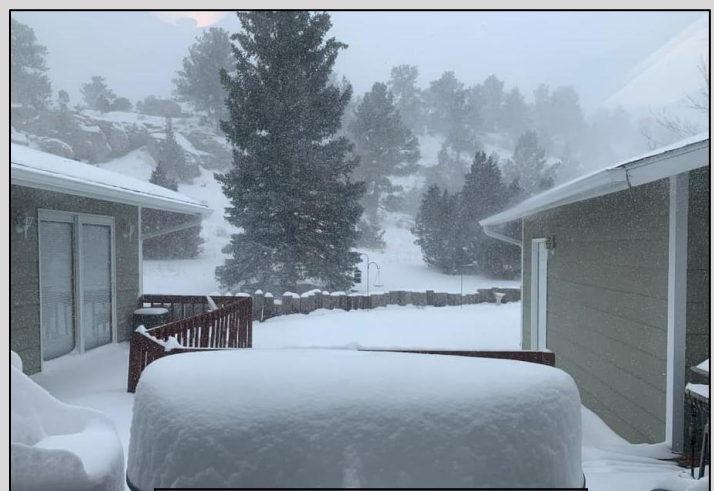
RECORD COLD: An unseasonably cold air mass settled over the region during the storm and lingered for several days. Many daily record low and cold high temperatures were set or tied from the 13-16th. Some locations even fell below zero, amazingly for mid-April, including Busby (-12°), Melville (-10°), Springdale (-7°), Huntley (-7°), Columbus (-6°), Harlowton (-6°) and Red

Lodge (-4°). The lows of 4° at Billings and 7° at Livingston on the morning of the 14th were the coldest on record so late in the spring.

RECORD LOW AND COLD HIGH TEMPERATURES TIED OR BROKEN			
BILLINGS	LIVINGSTON	MILES CITY	SHERIDAN
Low of 9° on the 13 th	High of 24° on the 12 th	High of 20° on the 13 th	High of 21° on the 13 th
Low of 4° on the 14 th	High of 24° on the 13 th	High of 28° on the 15 th	Low of 6° on the 14 th
Low of 10 on the 15 th	Low of 7° on the 14 th	Low of 11° on the 16 th	High of 26° on the 14 th
High of 29° on the 15 th	High of 23° on the 14 th		High of 26° on the 15 th
Low of 15° on the 16 th	Low of 8° on the 15 th		Low of 10° on the 16 th
	High of 29° on the 15 th		
	High of 30° on the 16 th		



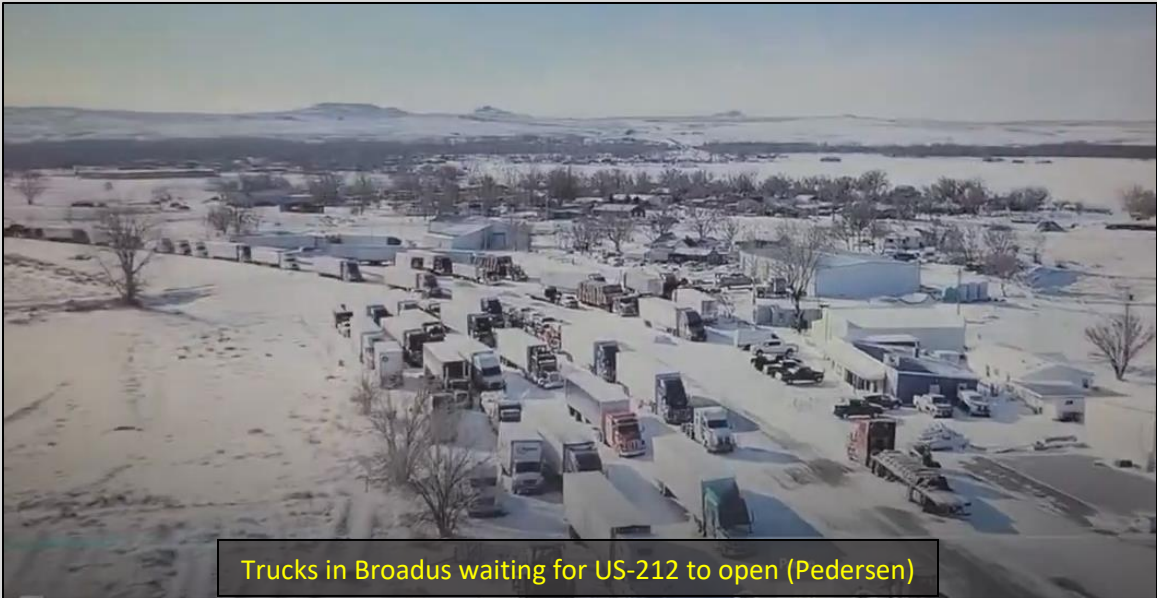
Storm's aftermath in Baker (City of Baker)



Heavy snow at Billings (Tedlund)



Heavy snow in Dean (Adams)



Trucks in Broadus waiting for US-212 to open (Pedersen)



Near Big Timber (McGann)

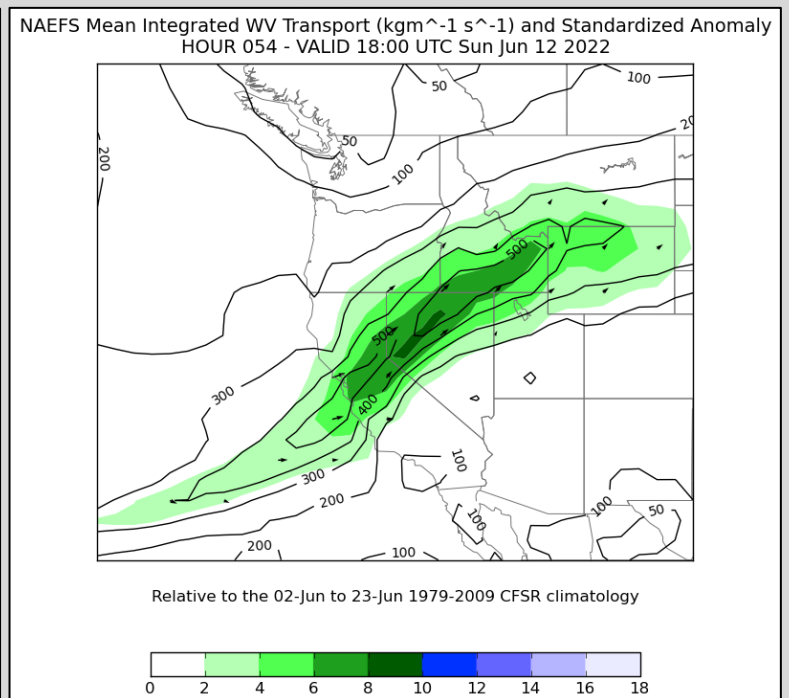
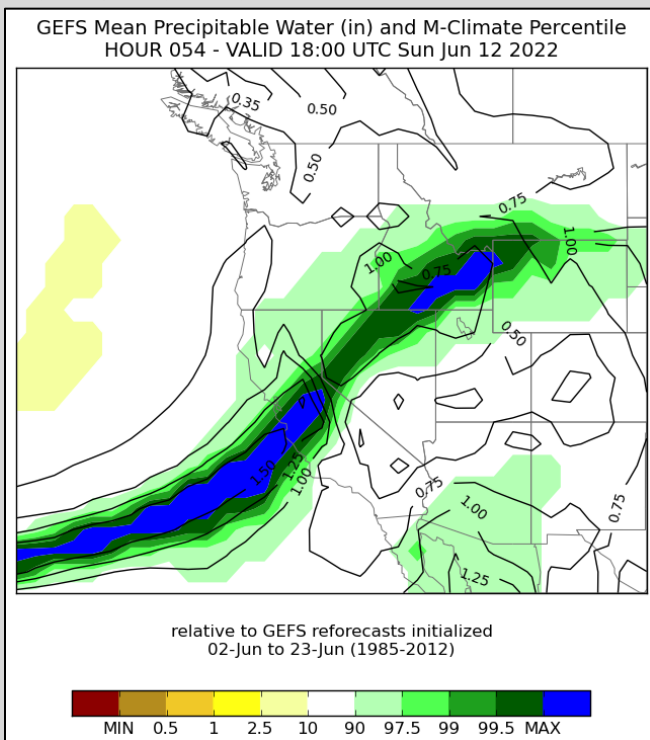


Red Lodge Mountain

#1: June 12-15: Historic Flooding

The combination of prolonged heavy precipitation and rapid mountain snow melt from the 10th through the 13th led to unprecedented and devastating flooding across the Beartooth-Absaroka Mountains and adjoining foothills. As discussed previously in event #5, the heavy wet snow that fell over the high country over Memorial Day weekend was an important component of this historic flooding.

METEOROLOGY: A very moist Pacific flow, aimed directly at south central Montana and associated with a low pressure system over the Pacific Northwest, brought persistent “upslope” precipitation to the Beartooth-Absarokas over a roughly 3-day period.



The high elevations received anywhere from 0.8 inches to over 5 inches of rain. This combined with 2 to 5 inches of water from snow melt, leading to a total water event of at least 4 to 9 inches. Below is a table showing how much snow melt and precipitation were observed, and total water contribution, at a few Snotel sites.

SITE	ELEVATION	SWE MELT	PRECIP	TOTAL WATER
Fisher Creek	9100'	3.6 inches	5.1 inches	8.7 inches
White Mill	8700'	3.0 inches	4.0 inches	7.0 inches
Parker Peak	9400'	3.5 inches	2.8 inches	6.3 inches
Monument Peak	8850'	2.0 inches	3.5 inches	5.5 inches
Placer Basin	8830'	3.0 inches	2.2 inches	5.2 inches

FLOOD IMPACTS: Impacts from the rapid water runoff began in the mountains and along the foothills, then spread downriver over the next several days. It was in essence a long duration

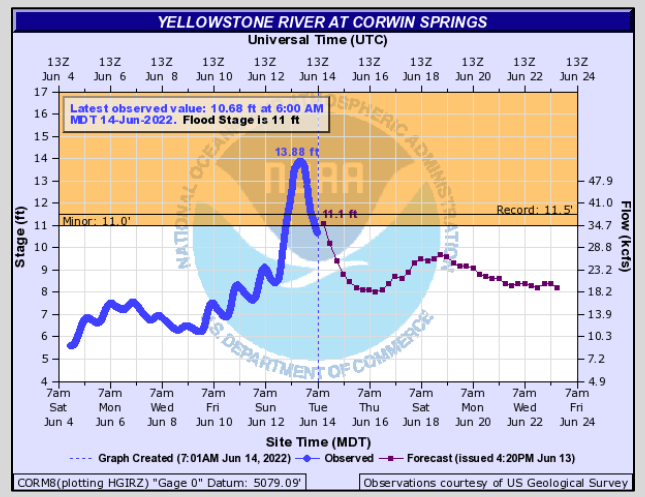
flash flood event, unlike any other spring flooding we've ever seen. The impacts from flooding were too many to list, and included the following:

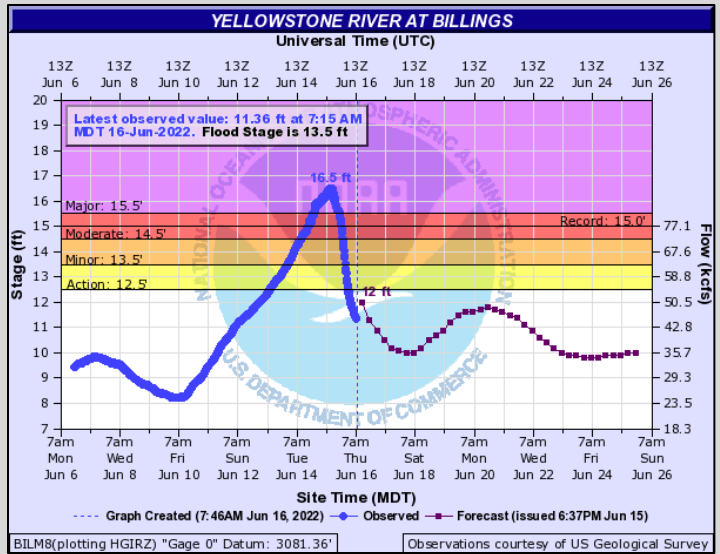
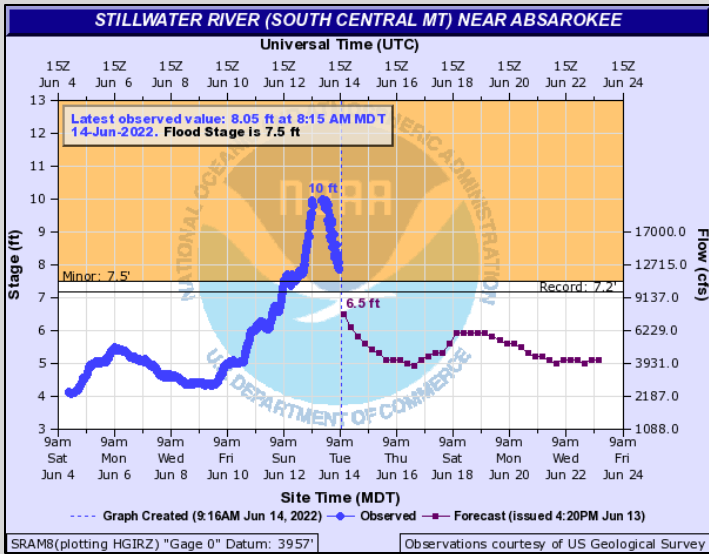
- Rock Creek flooded Red Lodge and washed out the Beartooth Highway south of town
- Road to East Rosebud Lake experienced a total wash out
- Nye Road at Stillwater Mine washed out
- 68 people at Woodbine Campground were stranded and eventually rescued via raft
- Main Boulder Road south of McLeod closed
- Extensive flooding around Columbus, Absarokee, Nye and Fishtail
- Carbella Bridge in the Paradise Valley washed out
- US-89 closed from MM 13-15 in Yankee Jim Canyon due to mudslide
- Gardiner to Mammoth highway closed due to several washouts (thus closing the north entrance to Yellowstone National Park)
- 3 bridges on Soda Butte Creek near Cooke City washed out
- Many people landlocked, including the communities of Gardiner, Cooke City, Silver Gate, the Cinnabar Basin, Tom Miner Basin, stretches of US-89 South, Mill Creek and Old Yellowstone Trail
- Water plant at Billings forced to shut down for a day due to record flood stage on the Yellowstone River



Rock Creek flowing through Red Lodge (NBC Montana)

HYDROGRAPHS & FLOOD STAGES: River levels rose rapidly to levels well above flood stages, and in many cases exceeded record stages. The following graphs show how fast water levels rose then subsided at a few USGS gauge sites. Also shown are the six sites that established new record flood stages during this event.

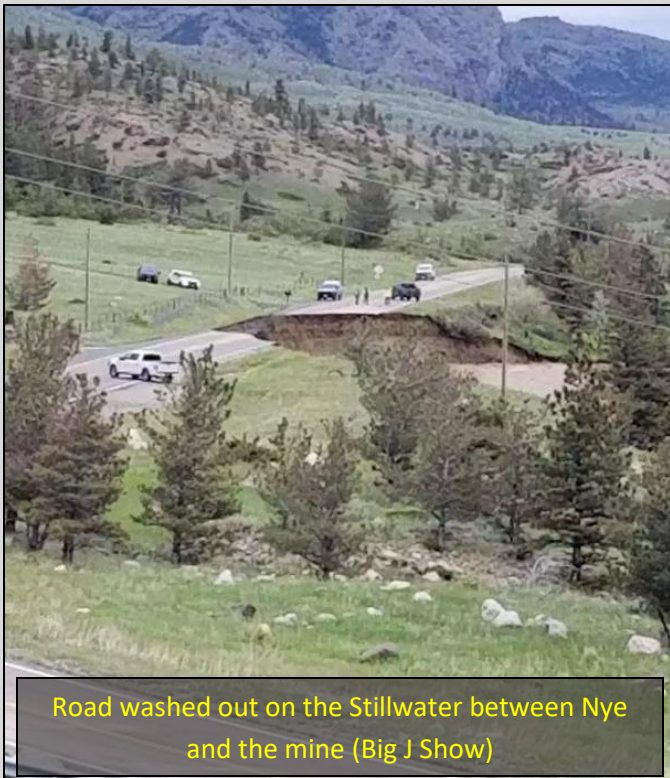




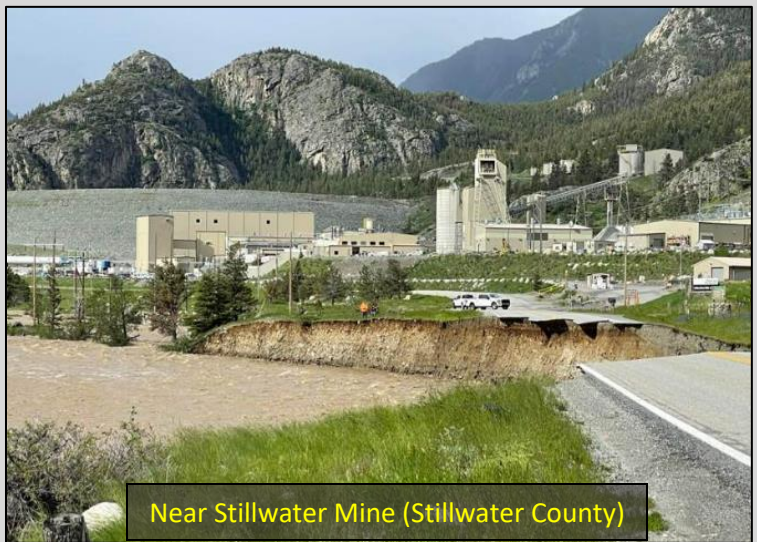
River Gauge Location	Peak Observed Stage	Previous Record
Yellowstone River at Corwin Springs	13.88 feet	11.5 feet
Yellowstone River at Livingston	11.63 feet	10.7 feet
Stillwater River near Absarokee	10 feet	7.2 feet
Clarks Fork near Belfry	12.93 feet	10.0 feet
Clarks Fork at Edgar	12.98 feet	9.5 feet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

PHOTOS: Thanks to the many people who shared photos with us during this historic flood event. Below is a sampling.





Road washed out on the Stillwater between Nye and the mine (Big J Show)



Near Stillwater Mine (Stillwater County)



Debris along the Stillwater River (Sheely)



Rock Creek near Red Lodge (Montana National Guard)



Clarks Fork River at Belfry (USGS)



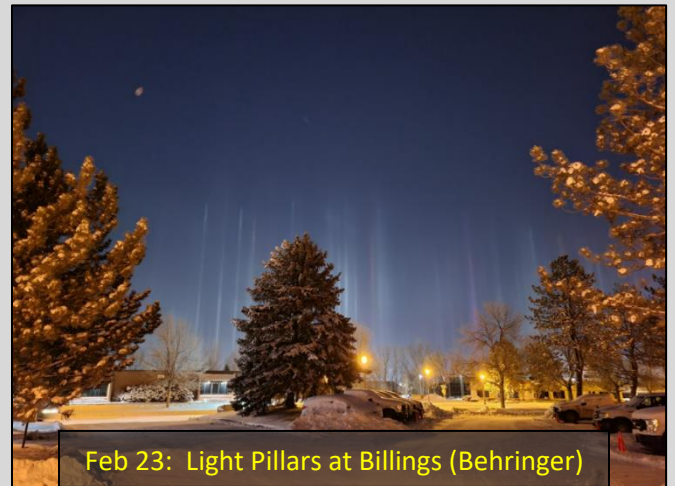
June 14: Yellowstone River at Billings – day prior to peak stage (Lester)



East Rosebud road damage (Custer Gallatin NF)

EPILOGUE: There were other significant events in 2022, and voting for only the top 5 was difficult this year. We want to acknowledge a few others. These include:

- January 21 freezing rain at Miles City
- Late February cold snap
- Late April blizzard in southeast Montana
- June 11 severe thunderstorm that caused significant wind damage in the Hardin area
- July 24 severe thunderstorm that impacted Billings with hail, wind and torrential rain
- Early September record heat, including the latest 100° on record at Billings & Sheridan
- December cold snap in the week leading up to Christmas



Feb 23: Light Pillars at Billings (Behringer)

Thanks for reading. We wish everyone a happy 2023!