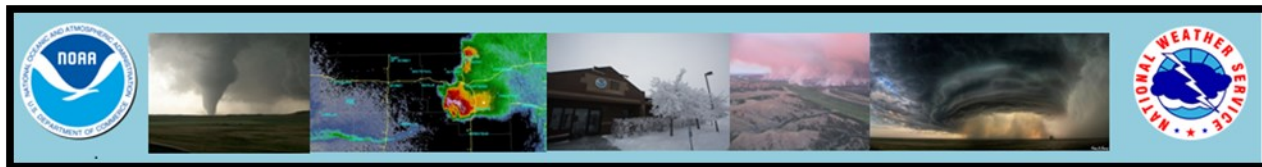


Under the Big Sky e-Letter February 2019



A Peak Inside:

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Join CoCoRaHS: Report your daily precipitation by becoming a CoCoRaHS weather observer today! It is a fantastic way to make a difference in your community, and getting involved can even help save lives! Check out the national CoCoRaHS [webpage](#) and click on **join** on the upper right to create your weather station today!



30 Day Percent of Normal Precipitation (Montana)

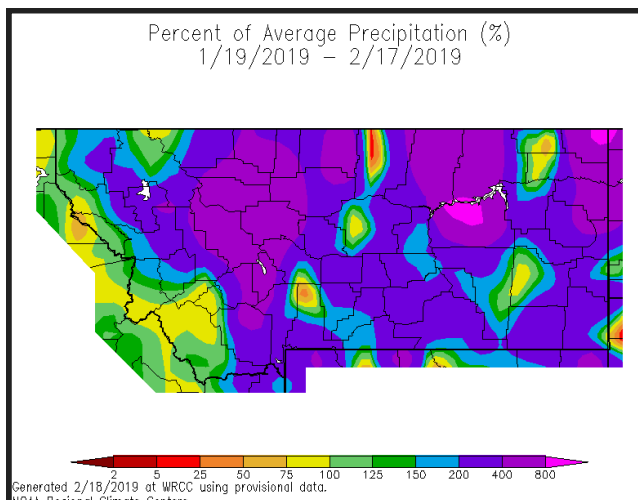


Figure 1: 30-day percent of normal precipitation across Montana.

30 Day Temperature Anomalies (Montana)

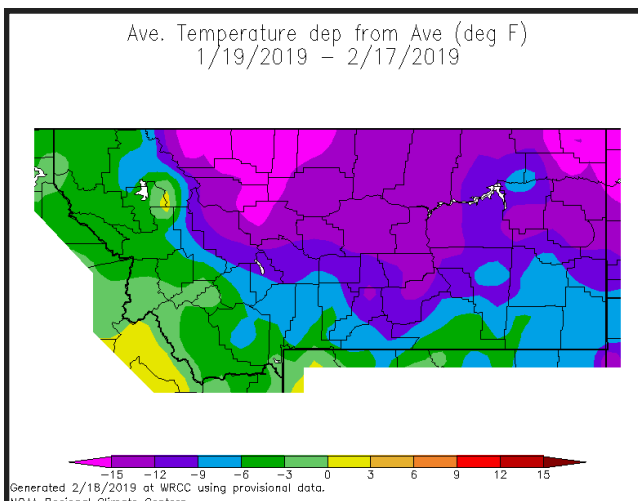


Figure 2: 30-day temperature anomalies across Montana.

Summary: Temperature and precipitation trends varied significantly across Montana over the past 30 days. For northeast Montana specifically, precipitation trended above normal while temperatures ranged below normal. This was largely influenced by the Arctic outbreak that has occurred since the early part of February.

Top 2018 Weather Events for Northeast Montana:

With 2018 in the rear view mirror, what are some of the weather events worth remembering as we head forward into the future? While it is impossible to include an exhaustive list of everything that happened last year, here are a couple of weather and climate highlights that stood out to us that we think are worth a mention.

1) Plentywood Tornado

During the evening of July 9, 2018, a supercell thunderstorm tracked southeast through Plentywood in Sheridan County. This supercell produced a damaging macroburst with maximum wind speeds estimated to be upwards of 118 mph. The NWS Glasgow weather office did a damage survey and found that an EF-1 tornado touched down on the southwest side of the macroburst area with maximum wind speeds of 110 mph. The tornado tracked for about 2.1 miles and had a maximum width of approximately 250 yards. The macroburst led to significant impacts at the airport in Plentywood where 10 general aviation planes were damaged or destroyed. The airport beacon suffered damage as well, and significant tree and roof damage was evaluated in town. The tornado impacted mobile homes, businesses, as well as vehicles throughout the area. The graphic below was created by Cory Mottice, Lead Forecaster at NWS Glasgow, which shows a map depiction of the areal coverage and track of both the macroburst and the tornado on that day.

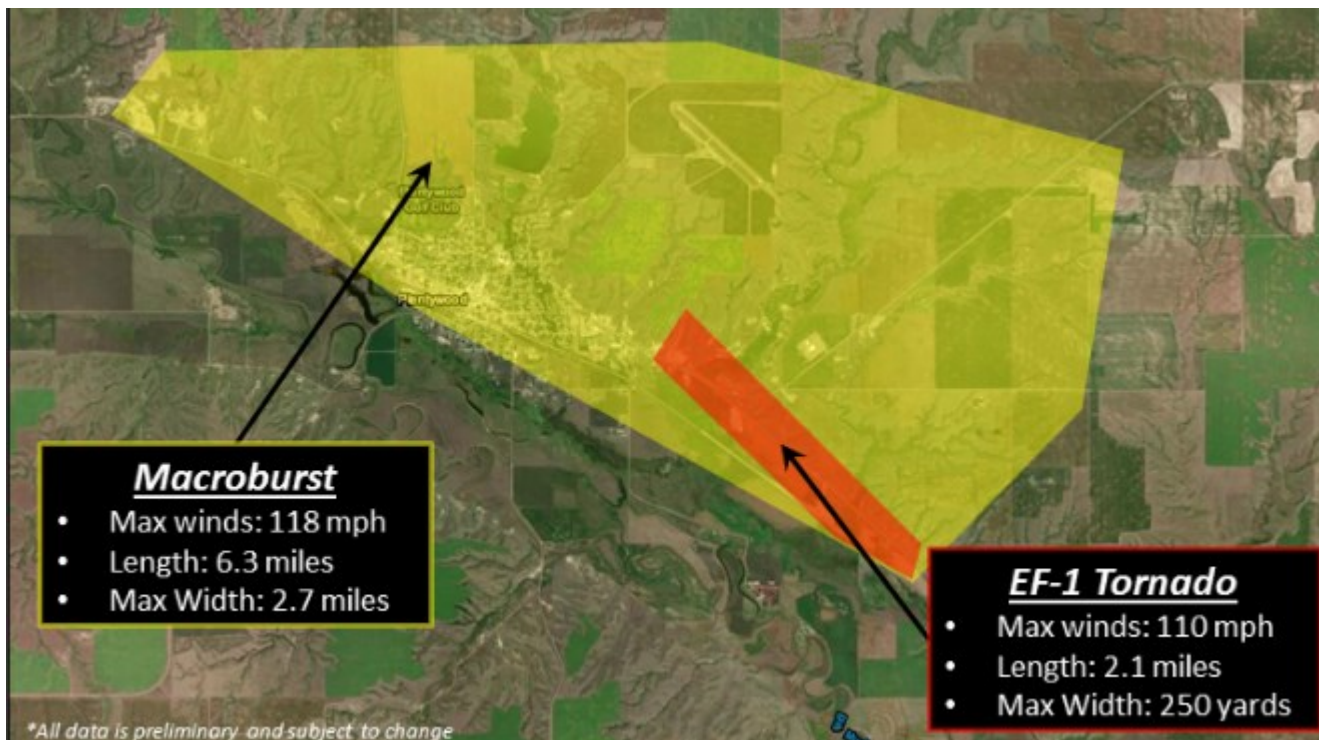


Figure 3: Graphic depicts path of macroburst and tornado tracking through Plentywood during the evening of July 9, 2018 created by Cory Mottice, Lead Forecaster at NWS Glasgow.

2) Extreme Summertime Temperatures

Big Sky Country sure is known for its wild swings in temperatures. In fact, 2018 brought with it some triple digit heat. As an example, Glasgow saw 7 days this past summer with high temperatures reaching 100 °F or warmer, and even one occasion with a low temperature that failed to get below 70 °F. That particular heat-wave crested as the warmest (and record) high of 107 °F occurred on two consecutive days (August 10 & 11,

2018). The high temperature of 101 °F occurring on August 9th was also a record. For Glasgow, MT this past meteorological summer (June-August) ranked as the 16th warmest on record.

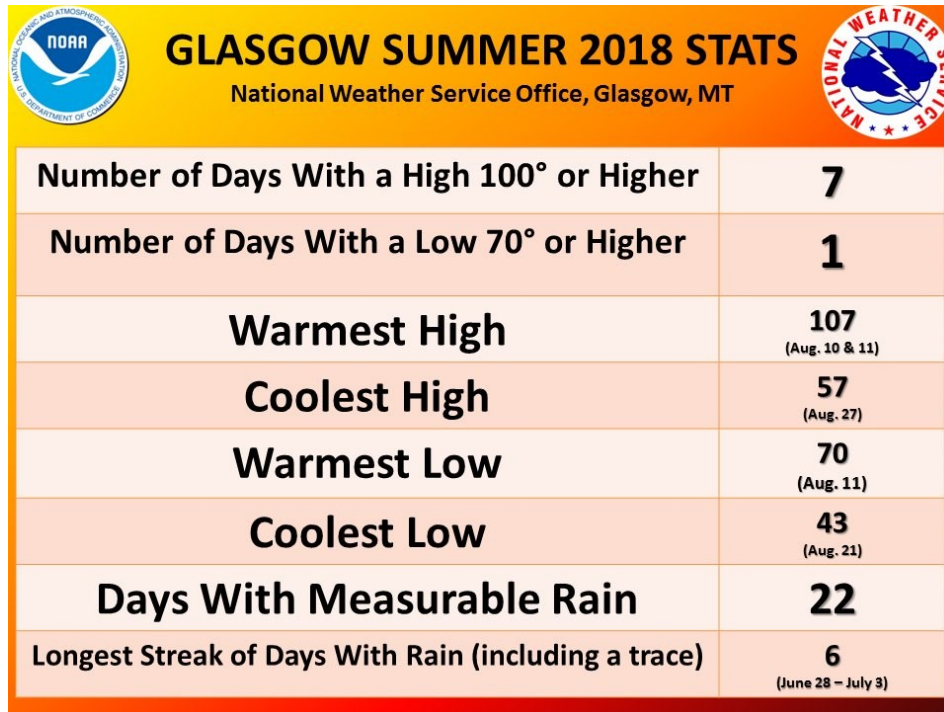


Figure 4: Image created by Mark Avery, Meteorologist at NWS Glasgow, showing a summary of statistics for Glasgow, MT during the summer of 2018.

3) For reference, and with a little help from Ted Jamba (Lead Forecaster, NWS Glasgow), here is a graph of temperatures as they occurred in Glasgow throughout 2018 as compared with climate normal and records.

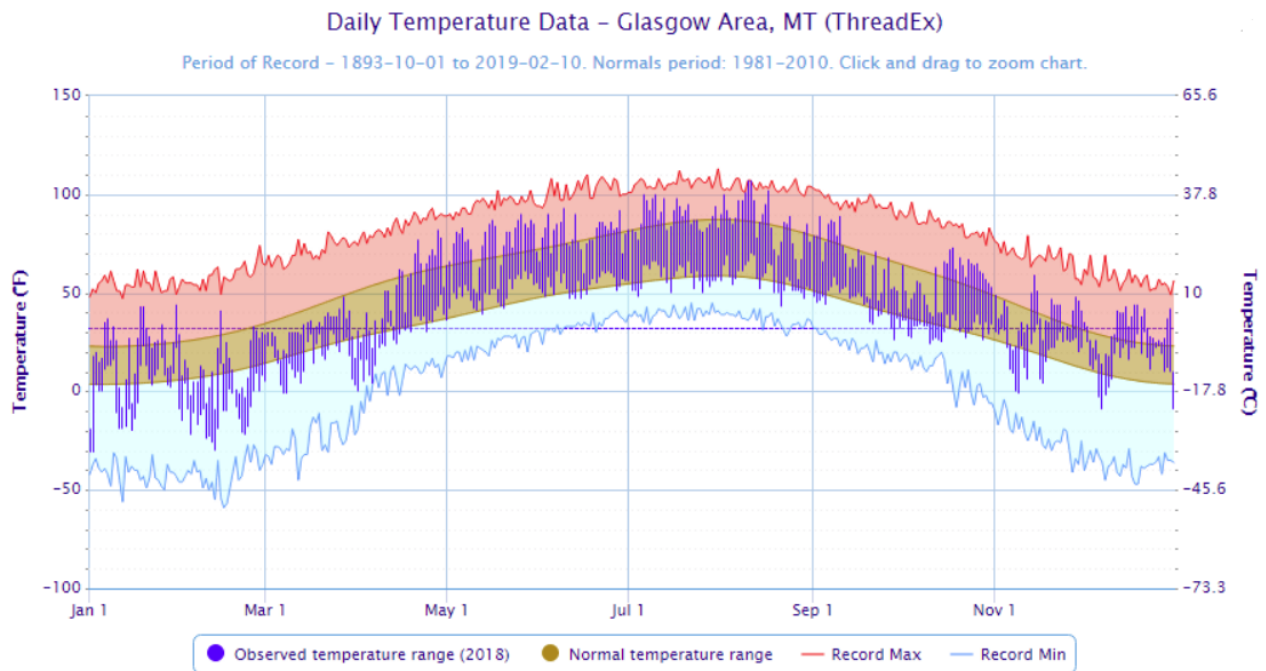


Figure 5: Graph of 2018 temperatures, normal, and records for Glasgow, MT, created by Ted Jamba, Lead Forecaster at NWS Glasgow.

The graph below shows the accumulated precipitation throughout 2018 and how it stacked up with normal.

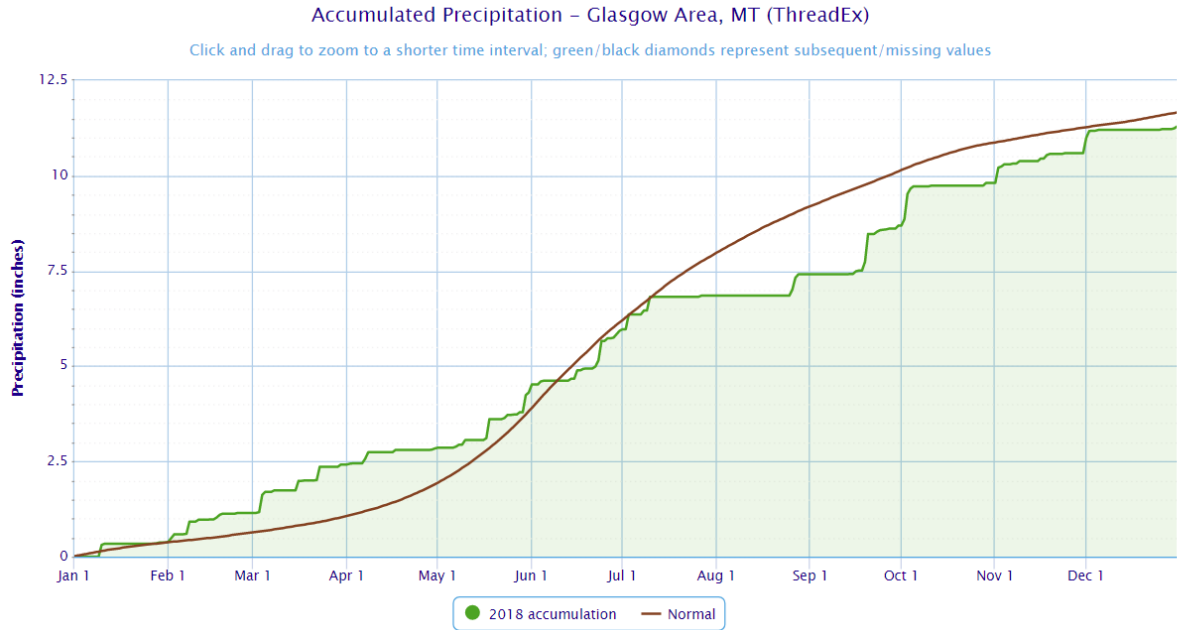


Figure 6: Accumulated precipitation compared with normal through 2018 for Glasgow, MT.

While it would be impossible to include every location in northeast Montana, to get a wider sense (larger sample area, below are the same graphs of 2018 temperature and precipitation for Glendive, MT.

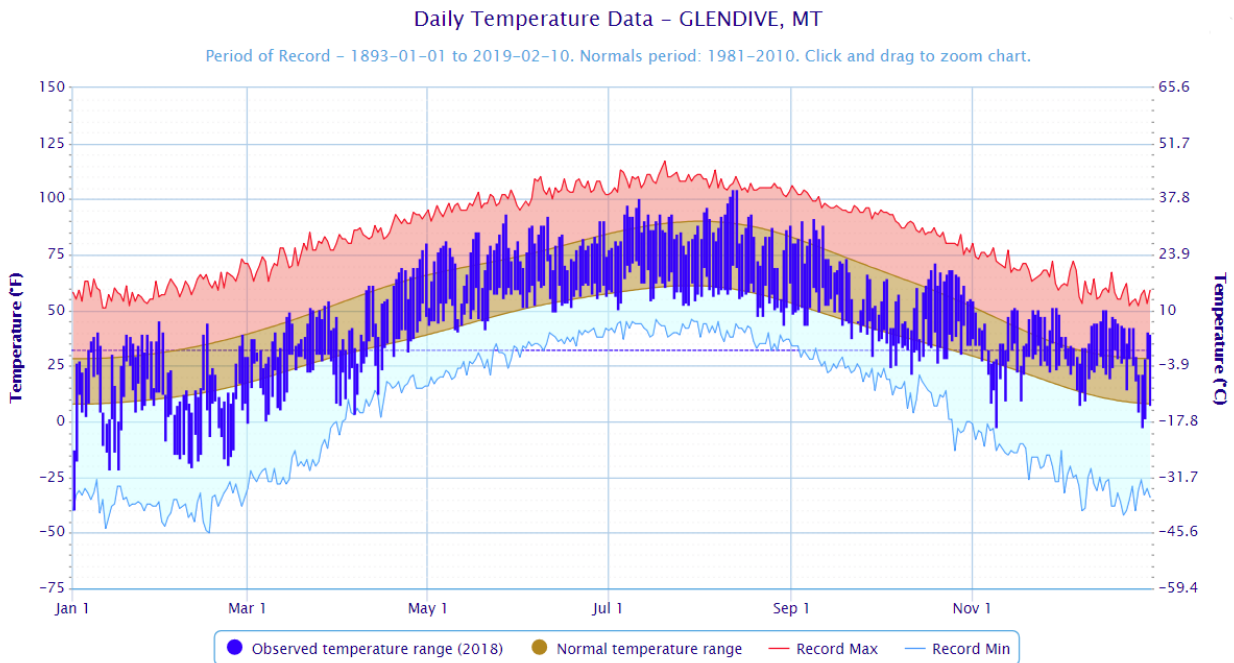


Figure 7: Graph of 2018 temperatures, normal, and records for Glasgow, MT, created by Ted Jamba, Lead Forecaster at NWS Glasgow.

The graph below shows the accumulated precipitation throughout 2018 and how it stacked up with normal.

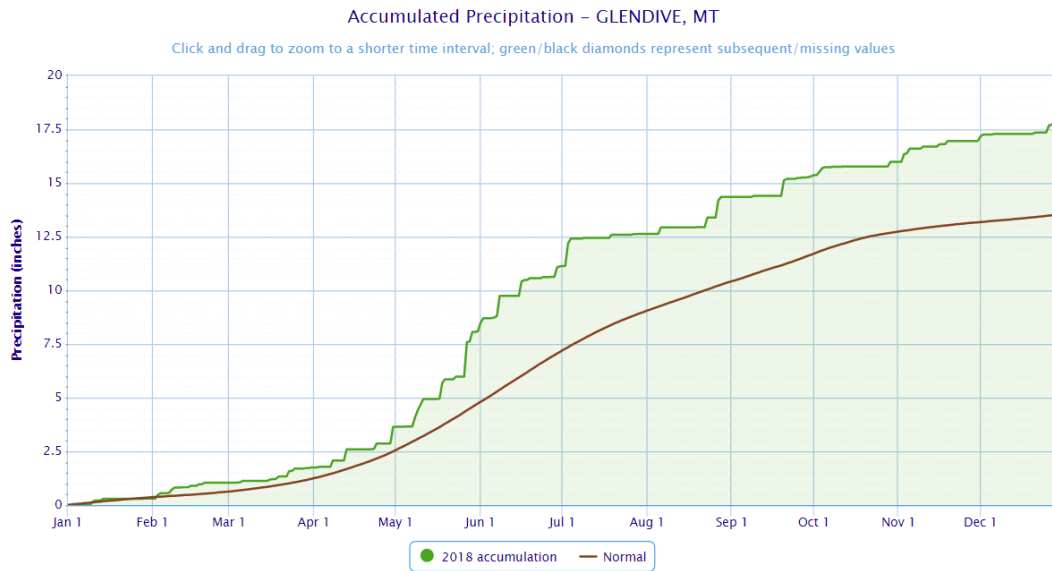


Figure 8: Accumulated precipitation compared with normal through 2018 for Glendive, MT.

In short, 2018 brought its fair share of variety to northeast Montana. From severe weather season to extreme summertime heat, there's no shortage of weather to look back on. One thing's for certain when living in Big Sky Country. If you're bored with the current weather, wait a day! Let's see what the rest of 2019 has in store!

Hydrologic Summary for January by Greg Forrester, Lead Forecaster at NWS Glasgow:

January was warmer than normal across Northeast Montana with above normal precipitation in the west and below normal precipitation in the east. The wet spots were Zortman with 1.27 inches, Glasgow 46SW with 0.96 inch, Winnett 12SW with 0.79 inch, and Carlyle 13NW with 0.78 inch. The dry spots were Wolf Point with 0.09 inch, Scobey and Bredette with 0.10 inch, and Hoyt with 0.11 inch. Glasgow had 0.29 inch which was 78 percent of normal.

Temperatures were between 6 and 12 degrees above normal for the month. Glasgow averaged 22.2 degrees which was 10.9 degrees above normal.

Stream flow was not available on the Milk, Missouri, Poplar, and Yellowstone Rivers due to the rivers being frozen.

The Fort Peck Reservoir elevation fell to 2234.4 feet at the end of the month. The reservoir was at 82 percent of capacity and 101 percent of the mean pool.

Note of interest: Fort Peck Lake was officially frozen over on February 4th of this year.

Northeast Montana's February Arctic Blast:

February brought a real reminder that winter is in full swing across northeast Montana. A storm system brought widespread 6 to 10 inches of accumulating snow, followed by a week long stretch of Arctic temperatures. For some, temperatures remained below zero degrees for more than a week! The NWS Glasgow has been busy issuing wind chill advisories and warnings during this stretch to help you stay safe from the dangers of frostbite and hypothermia. February 7th and 8th were the coldest thus far with much of the area experiencing low temperatures colder than 30 below, and wind chill readings as cold as 50 below zero. Below is a map shared on facebook on the morning of February 7th of current wind chills across the area at the time.

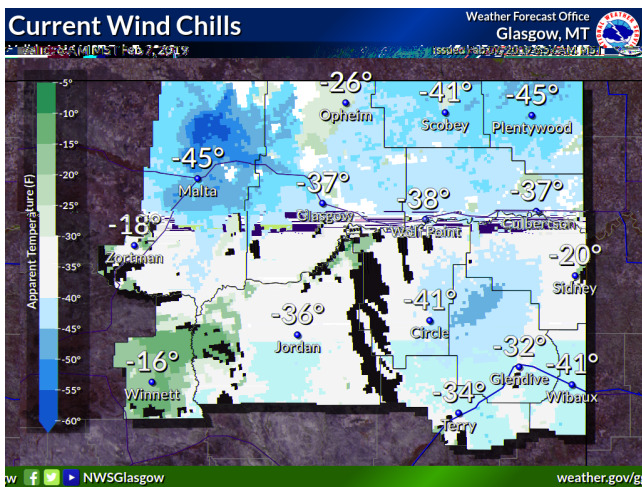


Figure 9: Map of wind chills as they occurred on the morning of 2/7/2019 across northeast Montana.

Four Buttes 13nnw	-50	Antelope 2sw	-50
Culberston	-48	Wolf Point 29ENE	-47
Medicine Lake 1ESE	-47	Scobey 1nw	-45
Poplar 4nne	-44	Circle	-44
Vida 9S/Cow Creek	-43	Glasgow 4n	-40
2 ENE Poplar	-40	Wolf Point Airport	-40
Poplar 2 ENE	-40	Saco	-40
Poplar Raws	-40	Saco 1E	-39
Froid	-39	Thoeny 1WSW/Bluff	-39
Whatley 4ESE	-39	Bredette 4W	-39
Culbertson	-39	Saco 1 NNW	-39
Sidney Airport	-38	Circle	-37
Nashua	-37	2 W Malta	-35
Frazer	-35	Fort Peck Power Plant	-35
Wibaux (school)	-34	Glasgow	-34
Glasgow Airport (ASOS)	-32	Comertown	-32
Glasgow 3sse	-32	6 WNW Jordan	-31
Baylor	-31	Comertown 6S	-31
Scobey	-31	Jordan Airport	-31
Navajo Mt5	-31	Navajo 1N	-30
Bredette 8WSW	-30	Glendive	-29
Malta 4.7ENE	-28	Malta 4e	-28
Culbertson	-28	Glendive Airport	-27
Terry	-27	Weldon 4W	-27
Mosby	-26	Port Of Morgan	-26

Figure 10: Plot of 24 hour low temperatures that occurred ending February 8, 2019 across northeast Montana.

Winter Weather Safety Reminders: Winter weather is already upon us across portions of northeast Montana, and it is only November! As the calendar turns to December, January, and the months to follow, we'll surely see our fair share of bitter cold temperatures, snow, freezing rain, and the like. With this will come the need to bundle up, but also the need to remember to slow it down and to allow extra travel time to reach your destination. The National Weather Service will be here to help you be weather ready by issuing the latest forecast, as well as any advisories and warnings to help you stay safe all season long. In the meantime, feel free to hop on over to our [Winter Weather Preparedness Page](#) so you can learn more about various winter weather hazards, as well as some important safety reminders.

Cold Weather Safety Reminders:

- 1) Follow the latest NWS forecast, advisories, and warnings.
- 2) If possible, avoid being outdoors in the early morning during the coldest part of the day.
- 3) Make sure pets and livestock have ample water and food and are protected from the extreme cold.
- 4) Make sure your vehicle has at least a half a tank of gas so you can stay warm if you become stranded.
- 5) Dress in layers.
- 6) Remember your winter survival kit.

Meet the Staff:

This Month's Portrait: Mark Avery, Meteorologist, NWS Glasgow

1. What do you enjoy most about working for the National Weather Service as a new forecaster?

The camaraderie. The good work environment. After spending 5.5 years out of weather, it's good to be back doing what I love doing, too.

2. How do you like north-east Montana living?

So far, so good! :) I'm enjoying the peace and quiet, the 1.5 mile, 5 minute commute vs. what Atlanta, GA offered. Air quality is better, too, except when there are wildfires to our west. I'm also resetting my concept of what is "close" or "not that far away."



Figure 11: Mark Avery, Meteorologist at NWS Glasgow.

3. Do you have any hobbies or interests that you'd like to share?

Photography. There's a lot of scenery around eastern Montana. Huge baseball fan (go Cardinals!), college football fan (M-I-Z-... #hailstate), and hockey fan (Let's Go Blues!). Cooking (favorite foods to make: baked French fries, baked onion rings, baked fried pickles, chili, hamburgers, fried rice, salads, steaks, Carolina cole slaw).

4. Can you name something that truly inspires you?

My boys inspire me. I try to set an example for them, even though two of them are grown now. My faith, of course. Knowing (or at least hoping) I'm taking care of the people in the area.

5. What's your favorite kind of weather? It's not 20 below, is it?

Hmm...Sunny and 80 with no humidity, bees/wasps, or mosquitos. Also, thunder snow. A tornado in an empty field far away from anything to hit. My least favorite is cold rain: 33-39 degrees and rain? Yuck.

CPC Three Month Outlook: The Climate Prediction Center released its three month outlook for temperature and precipitation for March 2019 through May 2019 on February 21, 2019. The three month outlook calls for equal chances for above normal, below normal, or normal temperatures for most all Montana, though above normal temperatures are favored over western Montana. Meanwhile, expect equal chances for normal, above average, or below average precipitation through the period to be favored across the state. One thing to keep in mind is that while this represents conditions expected over three months at a whole, individual smaller periods can be vastly different. We have been in a colder and wetter weather pattern since early February, and only time will tell when that breaks for sure. The latest outlook in full detail is always available [here](#) for anyone seeking additional details.



Figure 12: Climate Prediction Center three month temperature (left) and precipitation (right) outlook for March through May 2019.

Updated U.S. Drought Monitor: The [latest U.S. Drought Monitor](#) was released on Thursday February 21, 2019. The good news here is that much of the state of Montana is currently void of any drought conditions. That said, there are pockets in western Montana that are abnormally dry (yellow).

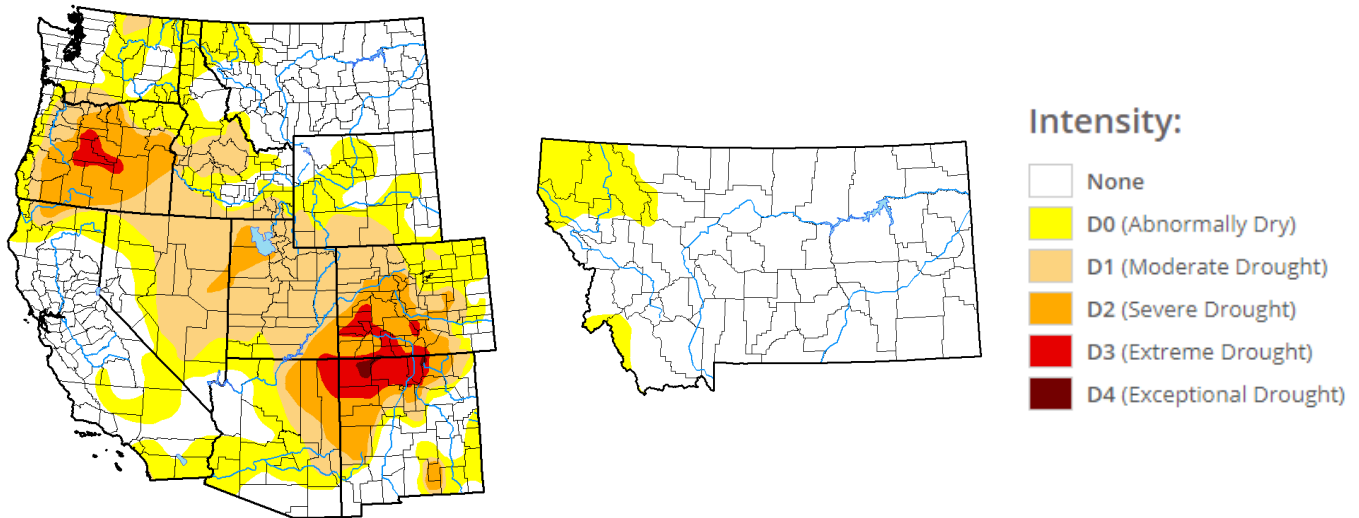


Figure 13: Latest Drought Monitor for the western U.S. (left) and Montana (right) released Thursday February 21, 2019.

U.S. Climate Highlights (January): The latest [U.S.](#) climate highlights for January 2019 are now available. A few points for you to take home are provided below.

U.S. Selected Significant Climate Anomalies and Events for January 2019

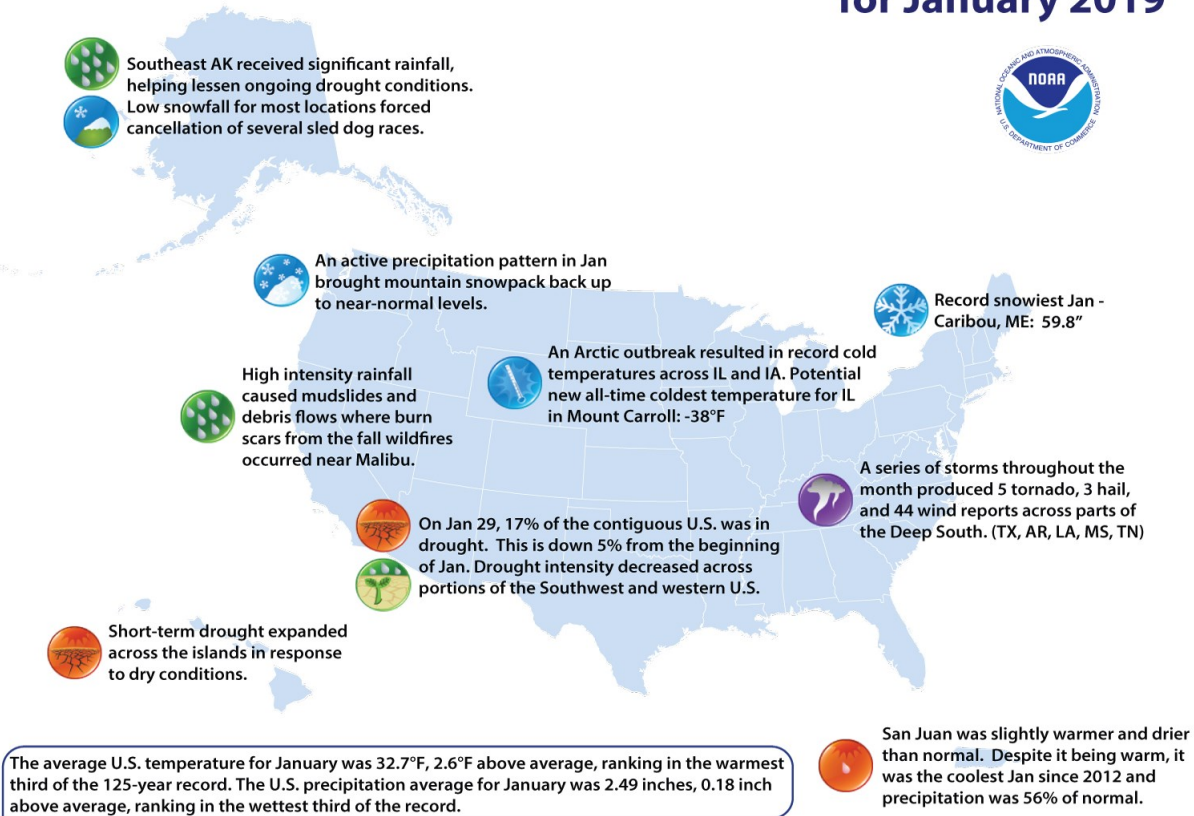


Figure 14: Climate Highlights for January of 2019.

U.S. Highlights for January 2019

- 1) The contiguous U.S. average temperature for January 2019 was 32.7 °F. This ranks within the top third of the period of record, spanning 125 years.
- 2) The average January precipitation total for the contiguous U.S. came in at 2.49 inches. This ranks within the top third wettest on record as well.
- 3) According to the U.S. Drought Monitor, 16.5% of the contiguous U.S. was in drought.
- 4) For portions of the High Plains, including Montana, temperatures were generally warmer than average (we have come a long way since then!).

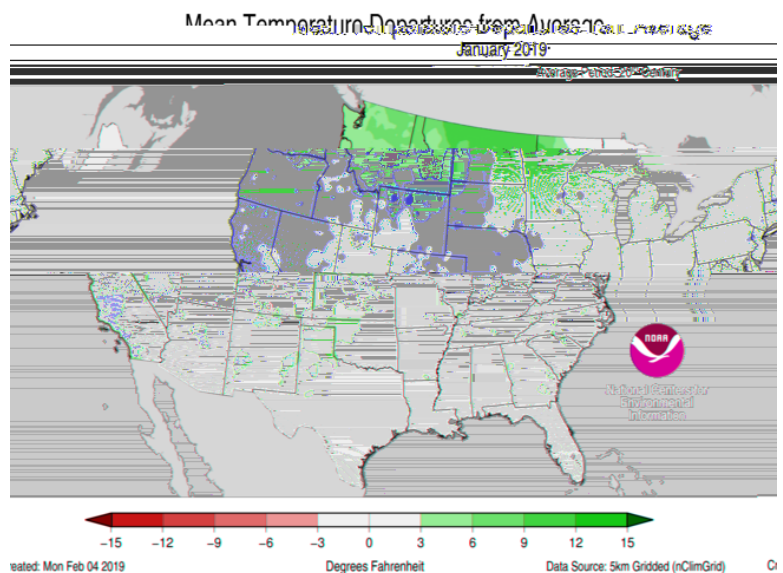


Figure 15: Mean temperature departure from average for January of 2019. Note above normal temperatures in Montana.

Precipitation Data (December 2018):

Station	Precipitation	Location
BAYM8	0.38	Baylor
BRDM8	0.24	Bredette
BTNM8	0.35	Brockton 17 N
BKNM8	0.50	Brockton 20 S
BKYM8	0.77	Brockway 3 WSW
BRSM8	0.73	Brusette
CLLM8	0.53	Carlyle 13 NW
CIRM8	0.73	Circle
CHNM8	0.62	Cohagen
COM8	M	Cohagen 22 SE
CNTM8	0.41	Content 3 SSE
CULM8	0.38	Culbertson
DSNM8	0.30	Dodson 11 N
FLTM8	0.53	Flatwillow 4 ENE
FPKM8	0.39	Fort Peck PP
GLAM8	0.64	Glasgow 14 NW
GGWM8	0.70	Glasgow WFO
GGSM8	1.34	Glasgow 46 SW
GNDM8	0.77	Glendive WTP
HRBM8	M	Harb
HINM8	0.59	Hinsdale 4 SW
HNSM8	0.15	Hinsdale 21 SW
HOMM8	M	Homestead 5 SE
HOYM8	0.18	Hoyt
JORM8	M	Jordan
LNDM8	0.57	Lindsay
MLAM8	0.95	Malta
MLTM8	M	Malta 7 E
MTAM8	0.13	Malta 35 S

Station	Precipitation	Location
MDCM8	M	Medicine Lake 3 SE
MLDM8	0.56	Mildred 5 N
MSBM8	0.51	Mosby 4 ENE
OPNM8	M	Opheim 10 N
OPMM8	0.15	Opheim 12 SSE
PTYM8	0.65	Plentywood
PTWM8	0.37	Plentywood 1 NE
POGM8	M	Port of Morgan
RAYM8	M	Raymond Border Station
SAOM8	0.44	Saco 1 NNW
SMIM8	0.45	St. Marie
SAVM8	0.64	Savage
SCOM8	0.23	Scobey 4 NW
SDYM8	0.73	Sidney
SIDM8	0.14	Sidney 2S
TERM8	0.39	Terry
TYNM8	M	Terry 21 NNW
VIDM8	0.64	Vida 6 NE
WSBM8	0.18	Westby
WTRM8	0.33	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	1.06	Wibaux 2 E
WTTM8	M	Winnett
WNEM8	0.29	Winnett 6 NNE
WNTM8	0.57	Winnett 8 ESE
WITM8	0.26	Winnett 12 SW
WLFM8	0.17	Wolf Point
ZRTM8	0.76	Zortman

Links You May Like:

[U.S. Climate in 2018 Assessment](#)

[Global Climate in 2018 Assessment](#)

[Winters Getting Warmer Across the U.S.](#)

[States & Cities Reducing Carbon Emissions](#)

[2018 Southwest U.S. Drought Unrelenting](#)

[Contextualizing Billion Dollar Disasters in 2018](#)

Precipitation Data (January 2019):

Station	Precipitation	Location
BAYM8	0.24	Baylor
BRDM8	0.10	Bredette
BTNM8	M	Brockton 17 N
BKNM8	0.39	Brockton 20 S
BKYM8	0.33	Brockway 3 WSW
BRSM8	M	Brusette
CLLM8	0.78	Carlyle 13 NW
CIRM8	0.31	Circle
CHNM8	0.34	Cohagen
COM8	M	Cohagen 22 SE
CNTM8	0.39	Content 3 SSE
CULM8	0.44	Culbertson
DSNM8	M	Dodson 11 N
FLTM8	0.55	Flatwillow 4 ENE
FPKM8	0.20	Fort Peck PP
GLAM8	M	Glasgow 14 NW
GGWM8	0.29	Glasgow WFO
GGSM8	0.96	Glasgow 46 SW
GNDM8	0.49	Glendive WTP
HRBM8	M	Harb
HINM8	0.45	Hinsdale 4 SW
HNSM8	M	Hinsdale 21 SW
HOMM8	M	Homestead 5 SE
HOYM8	0.11	Hoyt
JORM8	M	Jordan
LNDM8	M	Lindsay
MLAM8	0.41	Malta
MLTM8	0.28	Malta 7 E
MTAM8	M	Malta 35 S

Station	Precipitation	Location
MDCM8	0.20	Medicine Lake 3 SE
MLDM8	0.24	Mildred 5 N
MSBM8	0.41	Mosby 4 ENE
OPNM8	M	Opheim 10 N
OPMM8	M	Opheim 12 SSE
PTYM8	0.43	Plentywood
PTWM8	0.15	Plentywood 1 NE
POGM8	M	Port of Morgan
RAYM8	M	Raymond Border Station
SAOM8	0.18	Saco 1 NNW
SMIM8	M	St. Marie
SAVM8	0.39	Savage
SCOM8	0.10	Scobey 4 NW
SDYM8	0.51	Sidney
SIDM8	0.28	Sidney 2S
TERM8	0.29	Terry
TYNM8	M	Terry 21 NNW
VIDM8	0.16	Vida 6 NE
WSBM8	M	Westby
WTRM8	0.20	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	0.67	Wibaux 2 E
WTTM8	M	Winnett
WNEM8	0.40	Winnett 6 NNE
WNTM8	0.53	Winnett 8 ESE
WITM8	M	Winnett 12 SW
WLFM8	M	Wolf Point
ZRTM8	1.27	Zortman

Did You Know?: For Glasgow, the average high temperature climbs as high as 32 °F by the third week in February. While much of northeast Montana has been experiencing day after day of subzero overnight temperatures with daytime highs struggling to get above zero in some instances, we can all find a little comfort in the fact that at least, on the average, it is uphill from here. Spring is just around the corner, and hopefully as February turns to March, Mother Nature will decide to cooperate!

Monthly Trivia: Last month we asked...

New Question: How does an El Niño typically impact the winter in northeast Montana? Find out the answer in the very next newsletter!

Answer: In general, the main impact is for northeast Montana to experience milder than average temperatures during an El Niño winter. The graphic below shows the typical weather patterns across the U.S. during the winter when El Niño occurs, with the position of the Polar Jet Stream and Pacific Jet Streams superimposed. Keep in mind that while we can establish generalities, what actually happens on a given year can still vary quite a bit than what one might consider to be typical, even for a given pattern. There are many complex interactions at play that affect weather conditions for any given moment in any given season, so we can't simply say that just because we are in an El Niño winter pattern, that this is what we are going to get. As for when El Niño is expected to occur again, well, as of December 2018 we still had ENSO-neutral conditions. However, as winter turns to spring, El Niño conditions are expected to form. We'll see if the weather pattern shifts later this winter or early spring to see if it conforms to what is expected, or, if we get any surprises sent our way.

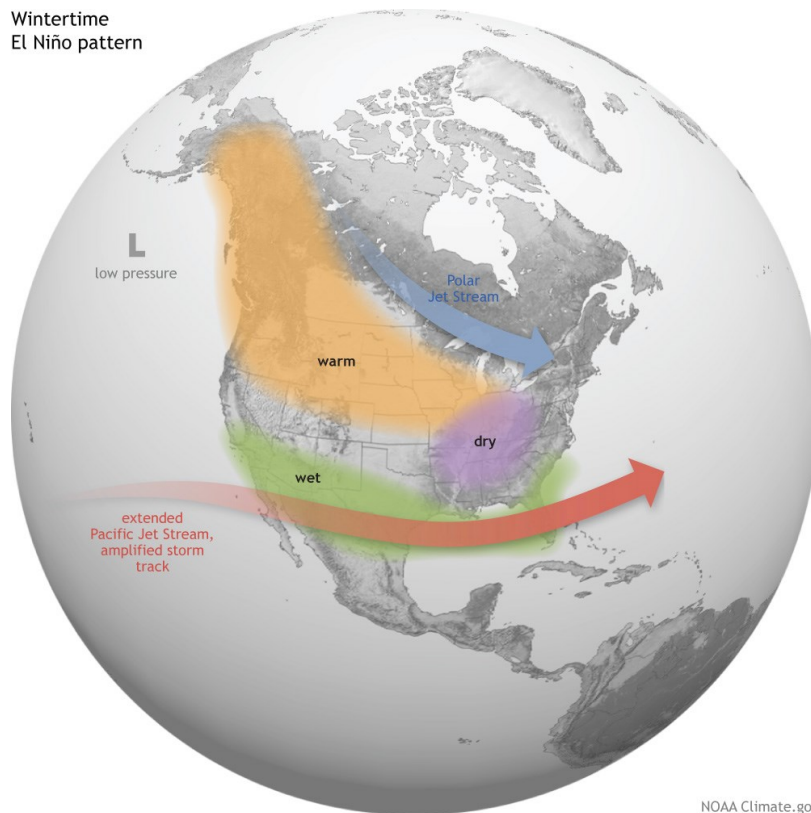


Figure 16: Courtesy of NOAA Climate.gov, the figure above shows the typical winter time weather pattern that unfolds across the U.S. during an El Niño event.

New Question: Although sub-zero temperatures can sometimes make it feel as though winter is never going to end, the Calendar suggests that spring is in fact, right around the corner! With the new season comes the threat of hazardous ice jam flooding along our rivers and streams. This month we ask, how do ice jams form and what are some of the ways that you can stay safe when they occur?

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[YouTube.com/NWSGlasgow](https://www.youtube.com/NWSGlasgow)