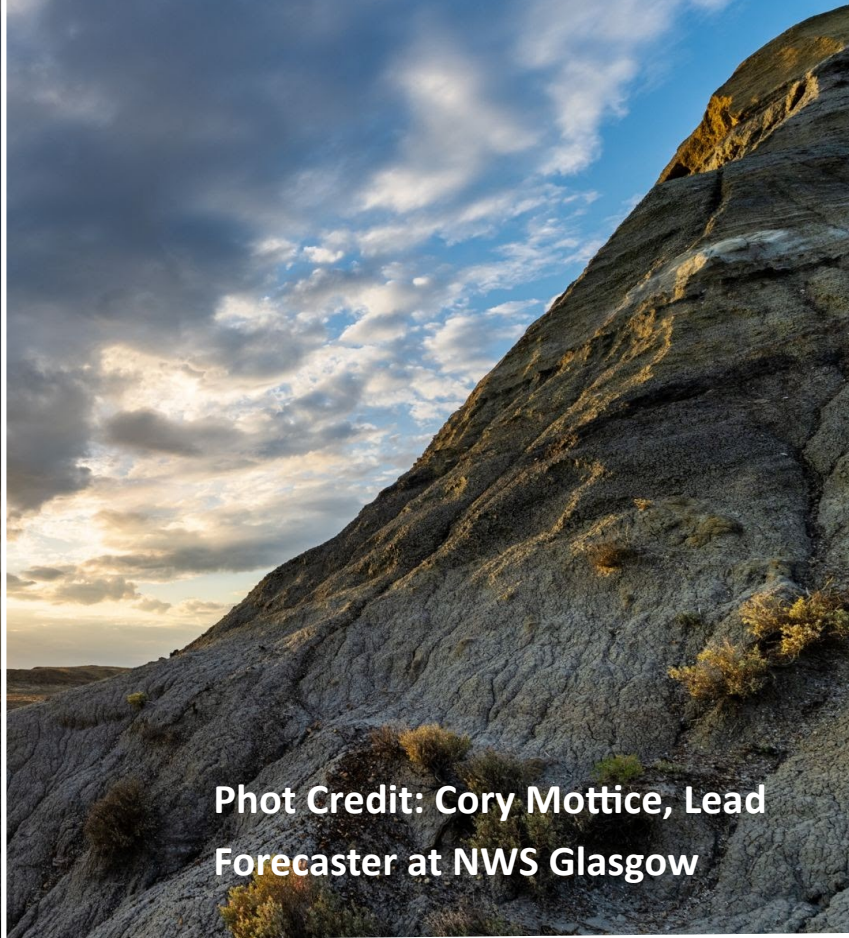


**Under the Big Sky
e-Letter
September 2021**



**Phot Credit: Cory Mottice, Lead
Forecaster at NWS Glasgow**

**National Weather Service
Glasgow, MT**



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National Weather Service

←————→
Glasgow, MT



Join CoCoRaHS Today!

CoCoRaHS is a grassroots organization with a network of highly committed observers who report daily precipitation such as rain, hail, or snow from all across the country. The data are used by meteorologists, insurance adjusters, mosquito control, and even by those in academia.



Participating in the CoCoRaHS program is a great way to make a difference in your community. Check out the [CoCoRaHS main page](#) to learn more! We are still accepting new observers so feel free to join through the main CoCoRaHS website today. All you'll need is a ruler and a rain gage to get started!

Additionally, we'll be doing a virtual fall training soon, so stay tuned for a coming announcement on the details!

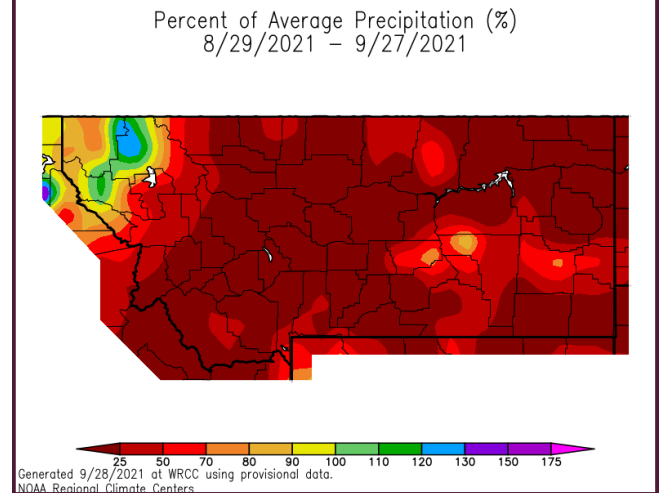


Figure 1: 30-day percent of normal precipitation across Montana.

Avg. Temp Departure from Normal (Montana)

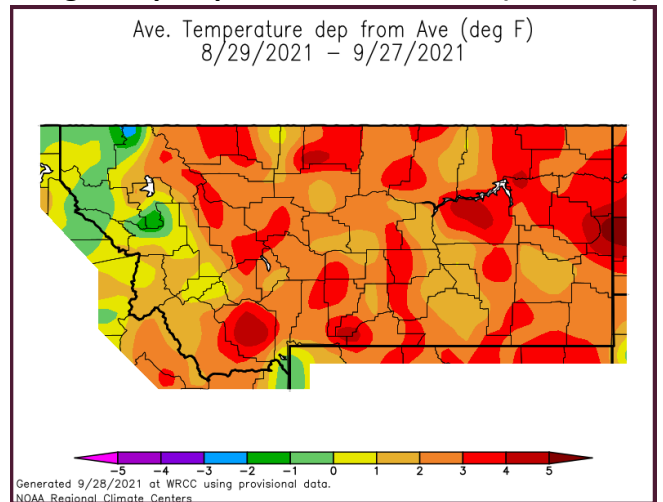


Figure 2: 30-day temperature anomalies across Montana.

Summary: Recent 30 day history shows markedly below normal precipitation across the state of Montana, contributing to extreme to exceptional drought. Only far NW Montana has seen near normal precipitation. Temperatures have been above normal over the same period for most of the state, again with near to slightly below normal temperatures over far northwest parts of the state.

Hydrologic Summary for August 2021, By Greg Forrester, Lead Forecaster at NWS Glasgow:

Temperatures were near normal for the month across Northeast Montana. Temperatures varied from 2 degrees below normal to 2 degrees above normal across the region. Glasgow averaged 71.2 degrees which was 0.2 degree above normal. Most areas in the west had above normal precipitation with the wet spots being Malta with 3.58 inches, Saco with 3.54 inches, and Opheim 12SE with 2.52 inches. Most areas in the east were below normal in precipitation with the dry spots being Hoyt with 0.44 inch, Culbertson with 0.85 inch, and Brockton with 0.92 inch. Glasgow received 1.82 inches which was 144 percent of normal.

The precipitation was not enough to reduce the extreme drought which continues over the region.

The Yellowstone River at Sidney had a record low stage of 1.08 feet on August 6. It broke the previous record low stage of 1.50 feet which occurred on August 12, 1961.

Stream flow on the Milk River was at or near record lows for most of the month. Flow on the Yellowstone River was at or near record low for the first 2 weeks of the month and then rose to near normal by the end of the month. The Poplar River had below normal stream flow during the entire month. The Missouri River had near normal stream flow for the entire month.

The Fort Peck Reservoir fell to 2229.0 feet during the month. The reservoir was at 75 percent of capacity and 94 percent of the mean pool.

Summer 2021 Overview for Northeast Montana
By Ted Jamba, Climate Focal Point

2021 Meteorological Summer (June-August)



	Glasgow	Wolf Point	Jordan	Sidney
Average Temp	74.3° (+5.1) 1st warmest	71.9° (+3.4) 1st warmest	73.5° (+5.5) 1st warmest	73.0° (+3.8) 3 rd warmest
Hottest Temp	110° July 19	107° July 19	110° June 15	104° July 20
# 90 deg Days	49	50	56	41
# 100 deg Days	15	12	20	8
Precipitation	2.94" (-3.11") 21 st driest	4.70" (-1.65") 6 th driest	4.64" (-0.56) 11 th driest	3.73" (-3.00") 12 th driest

Figure 3: 2021 Meteorological Summer Summary for NE Montana locations.

The Summer of 2021 will go down as a record hot and dry summer for most of us. Some respite came in August mainly for Phillips and Petroleum Counties where precipitation amounted to more than normal, but areas closer to North Dakota weren't so lucky.

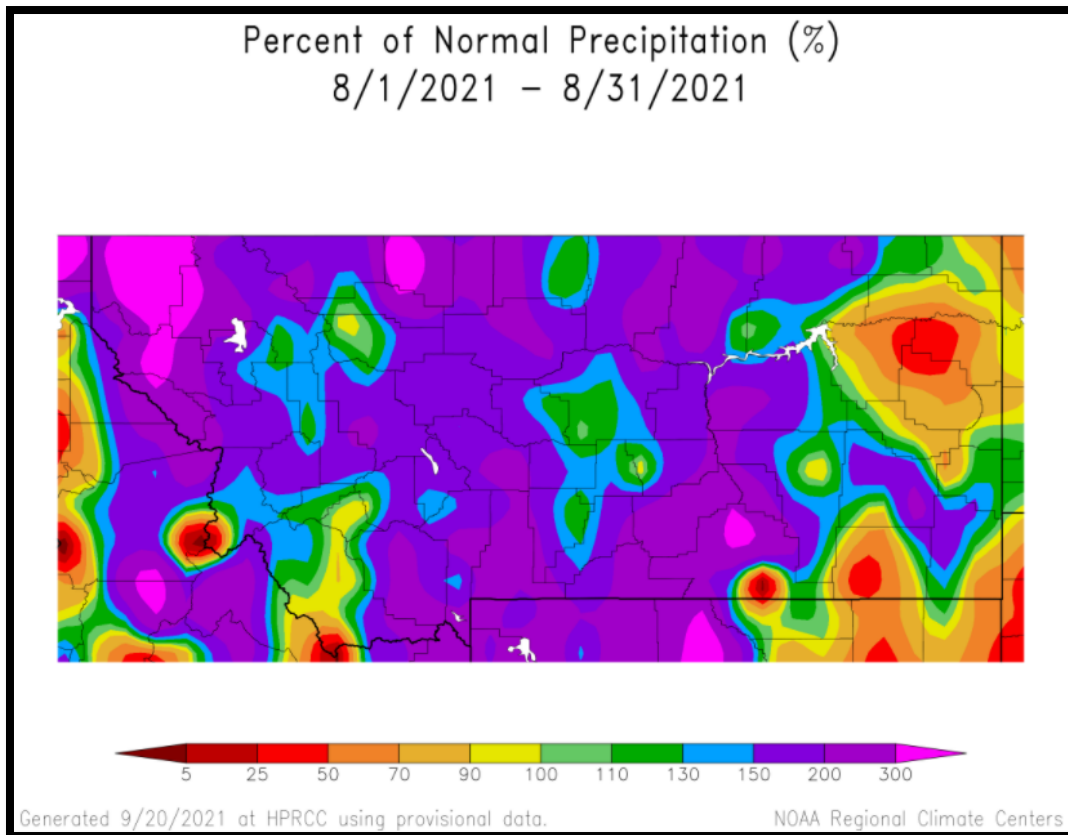


Figure 4: August percent of normal precipitation in 2021.

Summer 2021 Overview (Continued) By Ted Jamba, Climate Focal Point

For Glasgow, four daily high temperature records were broken in June and seven in July. It reached 110 degrees for the first time since 1936!

Up until this summer, 1936 set the benchmark as being the hottest summer for Glasgow, but this summer surpassed it by 0.3°. 1988 was previously in second place and now moves to third. 2021 surpassed 1988 by 0.7°.

For the Summer of 2021, much of northeast Montana only received 25 to 70 percent of normal (see following map). With temperatures above normal, evapotranspiration (*the process by which water is transferred from the land to the atmosphere by evaporation from the soil and other surfaces and by transpiration from plants*) was above normal.

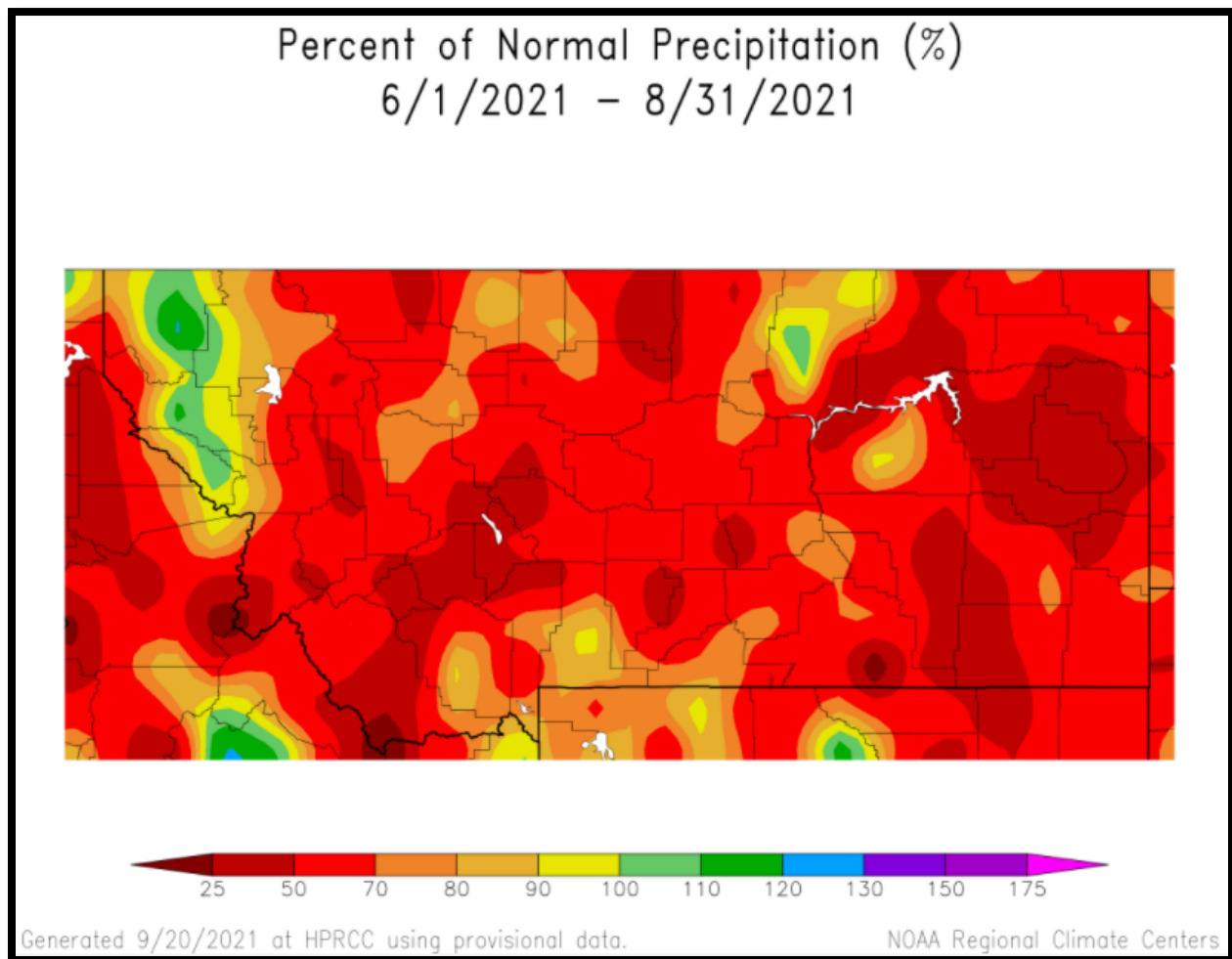


Figure 6: Summer 2021 percent of normal precipitation.

Summer 2021 Overview (Continued)
By Ted Jamba, Climate Focal Point

This map indicates how the average temperature departed from normal over the period:

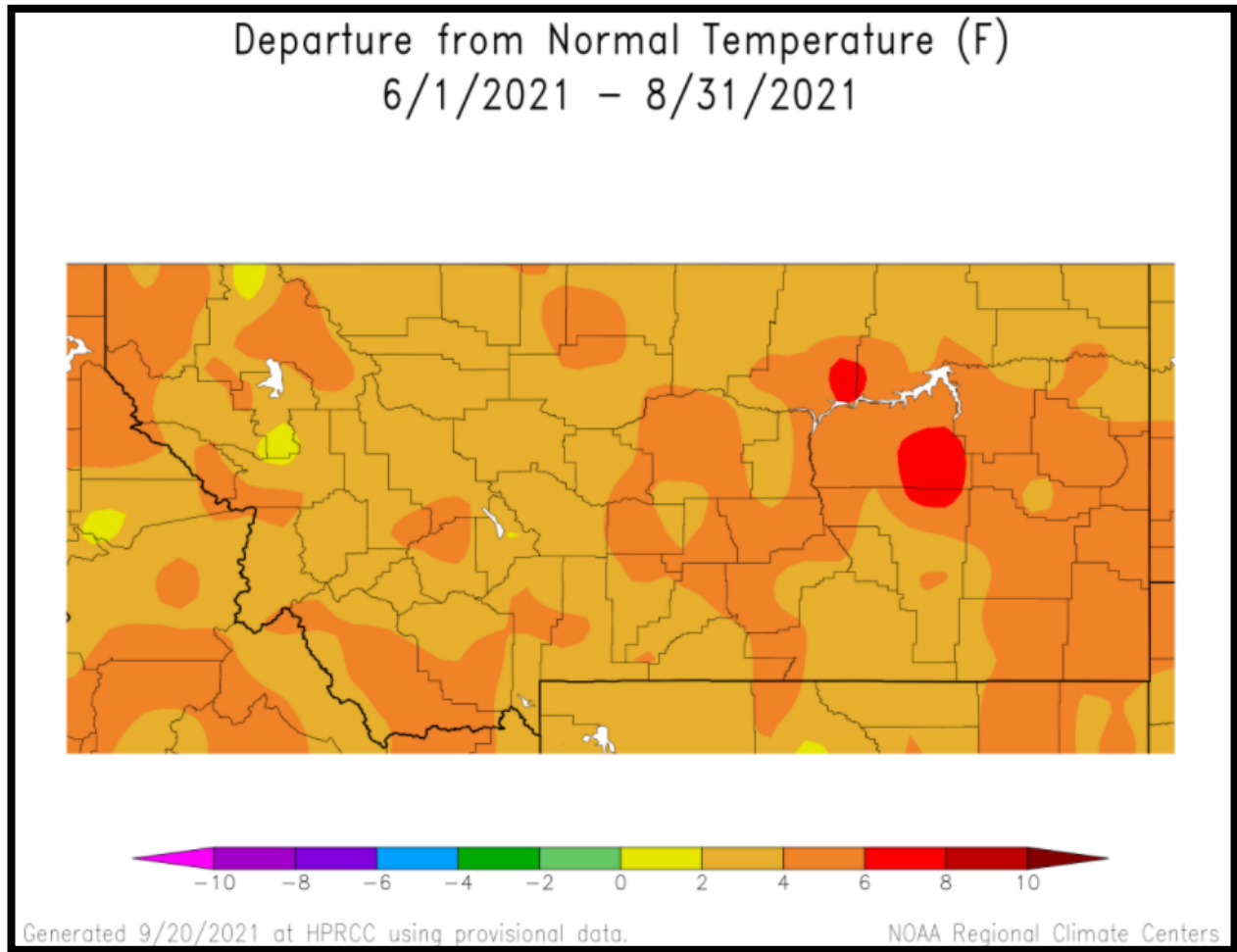


Figure 5: Average temperature departure from normal for the summer 2021.

Being that agriculture is a main driver in the local economy, hopefully above-normal precipitation will occur soon to replenish these deficits and in time for next year's yields.

CPC Three Month Outlook:

The Climate Prediction Center released an update of its three month outlook for temperature and precipitation for October through December on September 16, 2021. The outlook shows in general that there are equal chances for above normal, below normal, or normal temperatures. On the other hand, precipitation is favored to trend above normal for northwestern Montana, but again with equal chances for normal, below normal, or above normal precipitation for the rest of the state. At this time there remains no clear signal of a pattern change on the way that could help us to shake this drought.

The latest outlook in full detail is always available [here](#). In addition, you can check out the Climate Prediction Center [Interactive site](#)! You can zoom in on our area, and navigate to see the climate outlook for your specific location. The pie charts on the left hand side can be particularly useful for assessing the outlook at your specific location.

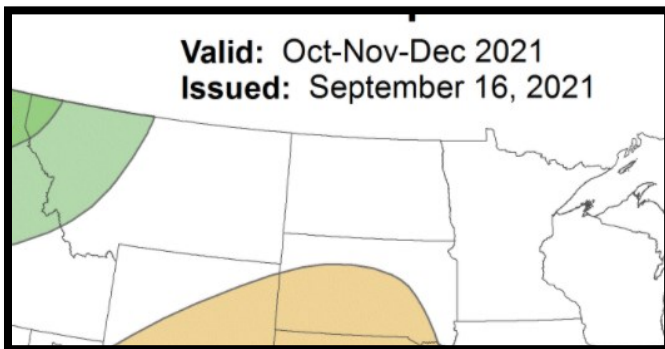
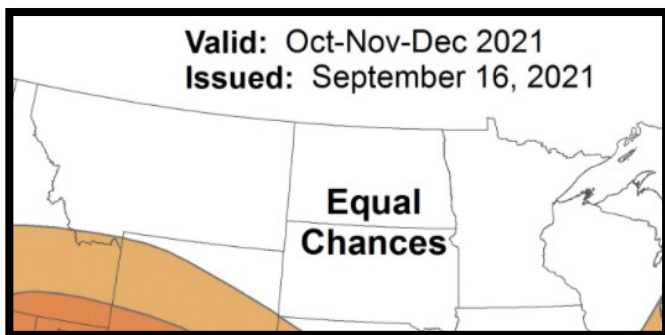


Figure 6: Climate Prediction Center three month temperature (top) and precipitation (bottom) outlook for October 2021 through December 2021.

U.S. Drought Monitor:

The latest U.S. Drought Monitor was released on Thursday September 23, 2021. Much of NE Montana remains under the grip of an unrelenting extreme to exceptional drought. This outlook is updated weekly. Please feel free to check out the latest [here](#).

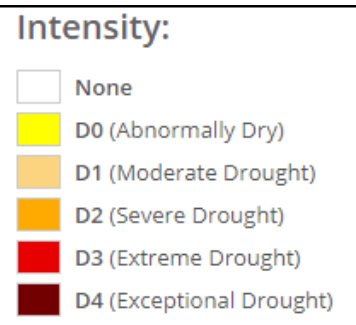
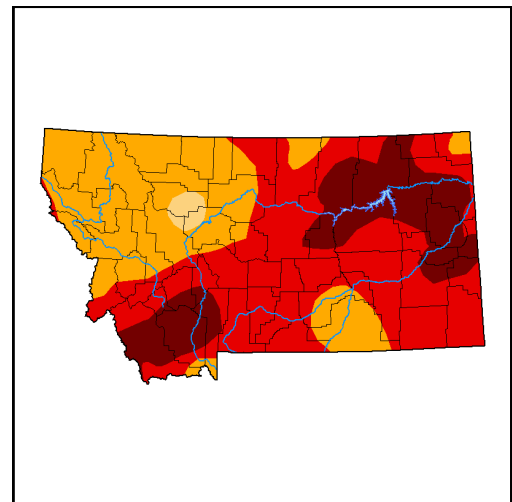
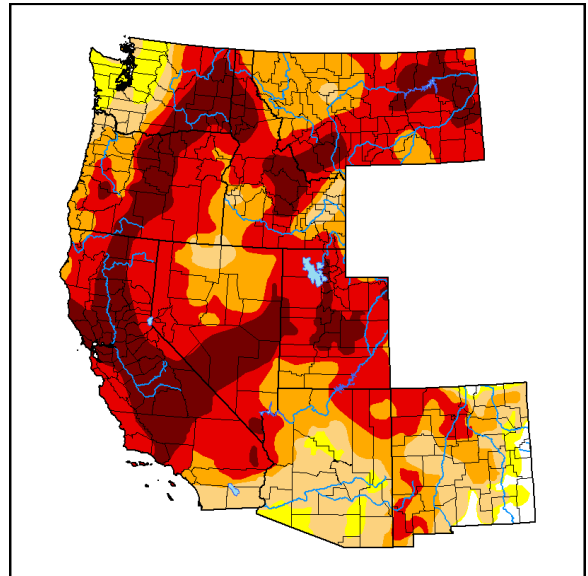


Figure 7: U.S. Drought Monitor updated September 23, 2021

U.S. & Global Climate Highlights (August): The [U.S.](#) & [Global](#) climate highlights for August 2021 have been released, the latest month for which data was available. A few points for you to take home are provided below.

Precipitation Percent of Average
August 2021
Average Period: 20th Century

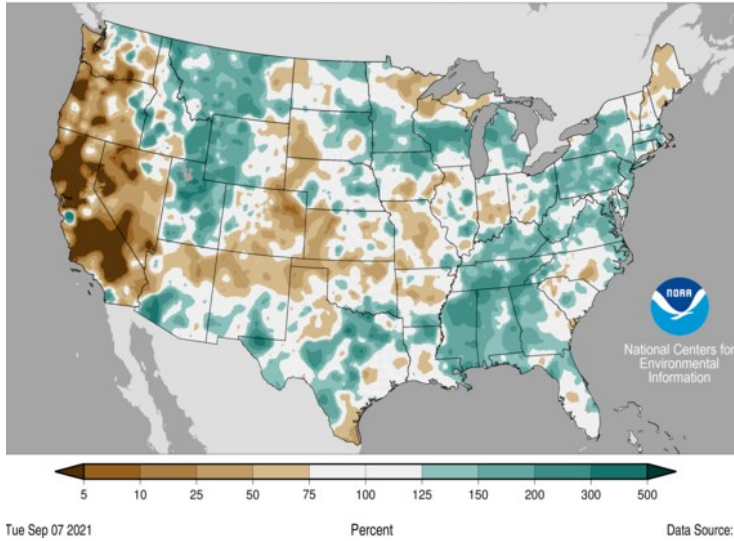


Figure 8: August 2021 Percent of Average Precipitation (U.S.).

U.S. Highlights for August 2021

- 1) The contiguous U.S. average temperature for August 2021 was 70.4 °F, 14th warmest on record
- 2) The average August precipitation total for the contiguous U.S. came in at 3.09 inches. This is the 14th wettest on record.

Global Highlights for August 2021

- 1) The August 2021 global surface temperature was the 6th hottest on record for August.
- 2) The land surface only experienced a near record high August temperature in 2021, just 0.07°F shy of the record warm August from 2016.
- 3) Precipitation anomalies varied considerably around the world in August 2021, which is fairly typical.

La Niña Watch (Update)

La Niña is increasingly likely (70-80% chance) to develop this winter. What does that mean for winter? Below is the typical pattern observed, but keep in mind that it does vary from year to year, and just because that’s what can happen during a “typical” La Niña, that doesn’t mean it is destined to happen this time (See more on La Niña on next page).

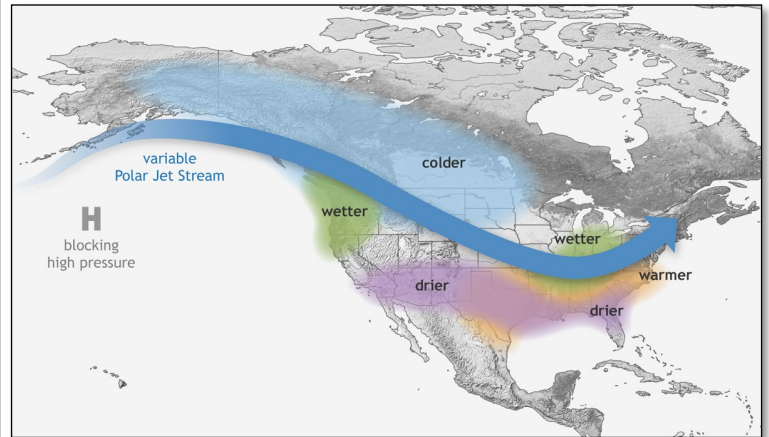


Figure 9: Typical La Niña winter time pattern from Climate.gov.

Links You May Like:

[ENSO Update](#)

[La Niña Watch](#)

[Southwest U.S. “Megadroughts”](#)

[Arctic Sea Ice & Climate Change](#)

[ENSO & Climate Change](#)

[Role of Clouds in Climate Prediction](#)

COOP 2021 Precipitation Totals for August 2021 (Preliminary)

Station	Precipitation	Location
BAYM8	M	Baylor
BRDM8	2.36	Bredette
BTNM8	M	Brockton 17 N
BKNM8	0.92	Brockton 20 S
BKYM8	1.11	Brockway 3 WSW
BRSM8	2.00	Brusette
CLLM8	1.62	Carlyle 13 NW
CIRM8	1.02	Circle
CHNM8	1.57	Cohagen
COM8	1.12	Cohagen 22 SE
CNTM8	1.52	Content 3 SSE
CULM8	0.85	Culbertson
DSNM8	M	Dodson 11 N
FLTM8	2.10	Flatwillow 4 ENE
FPKM8	1.31	Fort Peck PP
GLAM8	1.79	Glasgow 14 NW
GGWM8	1.82	Glasgow WFO
GGSM8	2.08	Glasgow 46 SW
GNDM8	1.46	Glendive WTP
HRBM8	M	Harb
HINM8	1.43	Hinsdale 4 SW
HNSM8	1.26	Hinsdale 21 SW
HOMM8	0.96	Homestead 5 SE
HOYM8	0.44	Hoyt
JORM8	M	Jordan
LNDM8	0.99	Lindsay
MLAM8	3.58	Malta
MLTM8	2.37	Malta 7 E
MTAM8	M	Malta 35 S

Station	Precipitation	Location
MDCM8	1.85	Medicine Lake 3 SE
MLDM8	1.19	Mildred 5 N
MSBM8	2.58	Mosby 4 ENE
OPNM8	1.87	Opheim 10 N
OPMM8	2.52	Opheim 12 SSE
PTYM8	1.44	Plentywood
PTWM8	M	Plentywood 1 NE
POGM8	2.41	Port of Morgan
RAYM8	1.15	Raymond Border Station
SAOM8	3.54	Saco 1 NNW
SMIM8	2.34	St. Marie
SAVM8	M	Savage
SCOM8	2.10	Scobey 4 NW
SDYM8	1.34	Sidney
SIDM8	1.27	Sidney 2S
TERM8	1.29	Terry
TYNM8	M	Terry 21 NNW
VIDM8	0.53	Vida 6 NE
WSBM8	M	Westby
WTRM8	2.29	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	1.30	Wibaux 2 E
WTTM8	M	Winnett
WNEM8	1.94	Winnett 6 NNE
WNTM8	M	Winnett 8 ESE
WITM8	2.23	Winnett 12 SW
WLFM8	1.13	Wolf Point
ZRTM8	2.39	Zortman

Monthly Trivia:


Last time we asked...

New Question: August is now in the rear view mirror. That means fall is coming and with it, cooler temperatures. This month we ask—what is the earliest date Glasgow, MT had a low of 32 °F?

Answer: The earliest date that Glasgow, MT had a low of 32 °F occurred on August 15, 1896. For those wondering, the latest date in any year occurred on June 20, 2002. Fall is here, and below freezing low temperatures on the regular will not likely be too far behind!



Photo Credit: Greg Forrester, Lead Forecaster at NWS Glasgow

 **New Question:** Autumn is here, and for NE Montana that means winter weather isn't that far off. Snow, freezing rain, and wintry mix will soon be in the forecast. Do you know what causes precipitation to fall as snow versus freezing rain, versus say a plain rain? We'll share that with you next month along with some winter safety reminders to help you prepare for the changing seasons.

Find us on Facebook, Twitter and YouTube! No account needed:

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