Under the Big Sky e-Letter
June/July 2018

A Peak Inside:

Join CoCoRaHS! This time of year it can rain at your place but remain dry across the street. Thunderstorm season offers a lot of variety in rainfall amounts and we rely on your data to get that ground truth. The more reports we get, the better, because it paints a clearer picture of what happened. The reports you send in can help in warning-decision making and can save lives! If you'd like to become a weather observer and send us your reports, consider **joining CoCoRaHS**! You can learn more on their website about how you can make a differenced in your community.

60 Day Percent of Normal Precipitation (Montana)

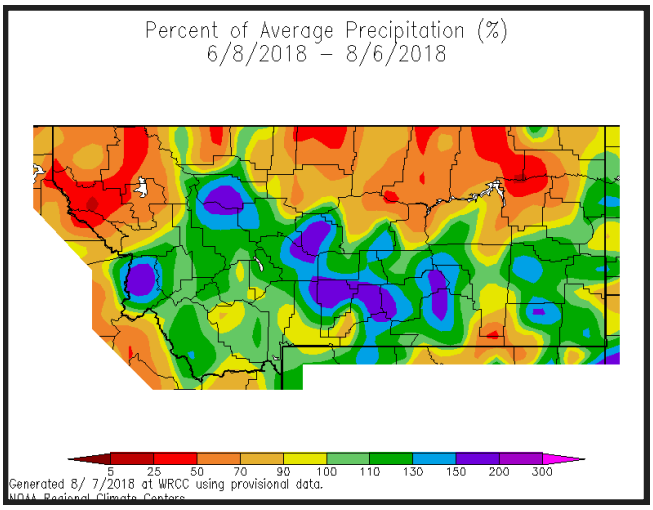

Figure 1: 60-day percent of normal precipitation across Montana.

60 Day Temperature Anomalies (Montana)

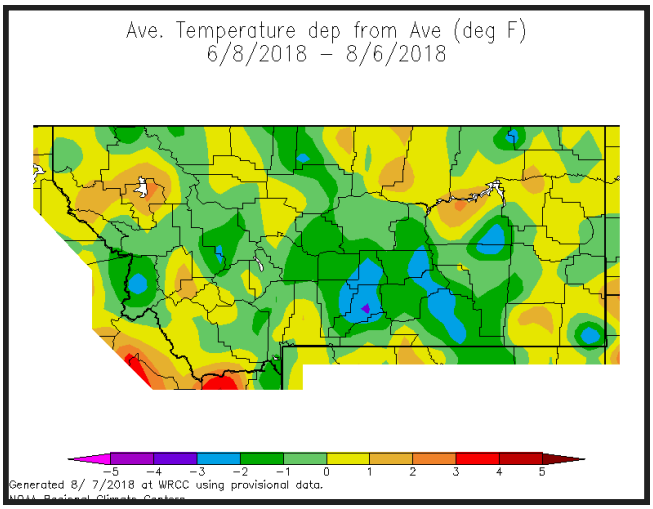

Figure 2: 60-day temperature anomalies across Montana.

Did You Know?: Climatologically we are now getting past the hottest part of the summer season. At the start of August the normal high is 87 and the normal low is 59 at Glasgow. By the end of August, the normal high is down to 80 with the normal low at 52. Fall is just a heartbeat away!

Plentywood Tornado:

This year's severe weather season thus far has produced the usual hail and wind events that northeast Montana has grown familiar with over the years. However, when looking back, this season in particular may be remembered for the Plentywood tornado.

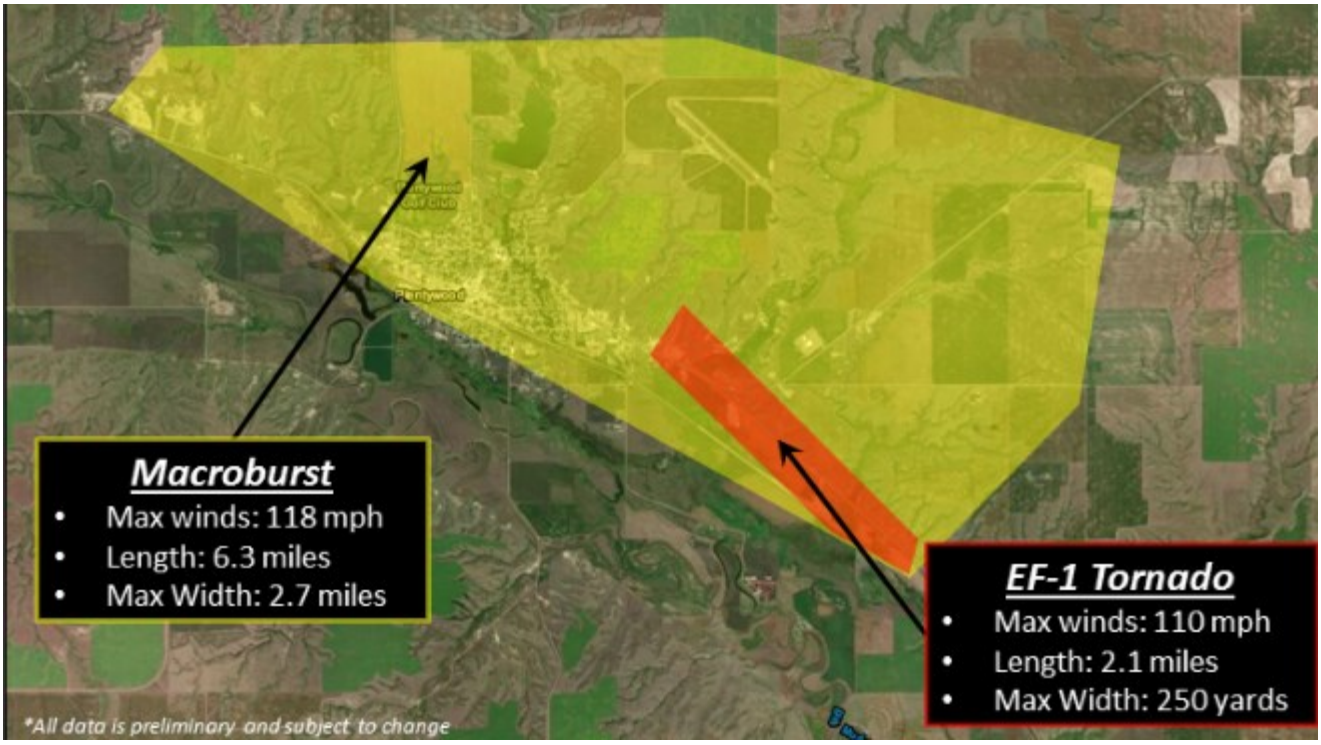

Figure 3: Graphic depicts path of macroburst and tornado tracking through Plentywood during the evening of July 9, 2018 created by Cory Mottice, Lead Forecaster at NWS Glasgow.

A supercell tracked southeast through Plentywood during the evening hours on July 9, 2018. As it did, it produced a brief tornado which occurred on the southeast portion of town. A damage survey showed that the tornado was an EF-1 with a peak wind speed of 110 mph. It had a path width of about 250 yards and a length of 2.1 miles. Thankfully, there were no injuries or fatalities to speak of with this event. That said, there was quite a bit of damage from the storm. Mobile homes, farm outbuildings, and an area one story business were all found to have had impacts. The survey found multiple empty trailers flipped over and a restaurant that had doors and windows blown out along with a portion of the roof. You can read the public information statement containing the preliminary damage survey results here.

Recent Staff Changes at WFO Glasgow:

The past few months have brought in a wave of new faces to WFO Glasgow, and we couldn't be more pleased to share with all of you some of the details of these changes. Additionally, in the coming months we'll highlight these new staff members in featured **"Meet the Staff"** articles so that you can get to know some of those working hard to serve you.

First, Cory Mottice is a new Lead Forecaster at our office, as of April 23, 2018. He has previously demonstrated welcome experience in decision support services as well as involvement in fire weather, social media, and satellite programs prior to coming to Glasgow. Cory also has been a webmaster previously and has demonstrated the know-how when it comes to making routine products easier for staff. It will be exciting to see how Cory can apply his knowledge and gained experience here at Glasgow and we are all very excited to have him as part of our team!

Kandis Lawrence is a summer student who has arrived at Glasgow to help us work on IT needs. She has a bachelor's degree in Urban Practice and Policy, as well as an associates degree in cybersecurity. Kandis has also previously worked with emergency managers from the state of Virginia. Given how important emergency managers and other deep core relationship partners are to the National Weather Service, the experience Kandis has will surely be as valuable for us as it is for her. We welcome her here and hope that she enjoys her time at Glasgow!

Ross Allen became the ITO at NWS Glasgow on June 11. In addition to working previously with the USACE, he also had his own video production company. His experience and IT specialization will surely help the office excel when it comes to the future of decision support services, as well as programming support for the various other products and services we put forward.

Mark Avery joined NWS Glasgow as the newest Intern Meteorologist as of June 11. He previously worked for the North Dakota Cloud Modification project more than 20 years ago, and he has a background in broadcast meteorology having worked for The Weather Channel for 8 years. His communications experience will be an asset when it comes to providing decision support services to our partners and conveying important messaging to those we serve. We are glad to have Mark here with us as part of our family of staff!

Last, but certainly not least, is Felix Castro. He is the newest Lead Forecaster hire at NWS Glasgow. A graduate of Florida State, and having completed a Master's in Environmental Studies at the University of Illinois at Springfield, his education combined with his experience working at WFO San Juan, PR will serve him well at Glasgow. Given the variety of weather experienced at NWS Glasgow from extreme cold and snow to drought, heat, and wildfires in the warm season, Felix will undoubtedly expand his skillset beyond his vast experience in tropical meteorology. We welcome him here and look forward to working with him!

CPC Three Month Outlook: The Climate Prediction Center released its three month outlook for temperature and precipitation for August 2018 through October 2018 on July 19, 2018. The three month outlook calls for increased chances for above normal temperatures for most of the state of Montana. Meanwhile, expect equal chances for normal, above average, and below average precipitation through the period. The latest outlook in full detail is always available here for anyone wanting further information.

Figure 4: Climate Prediction Center three month temperature (left) and precipitation (right) outlook for August2018 through October 2018.

Updated U.S. Drought Monitor: The latest U.S. Drought Monitor was released on Thursday August 2, 2018. While much of southern Montana is void of drought conditions, sections of northern Montana have been abnormally dry. A few spots are even under the influence of moderate drought. Precipitation trends that occur in the coming months will help determine whether or not improvement is seen in these locations.

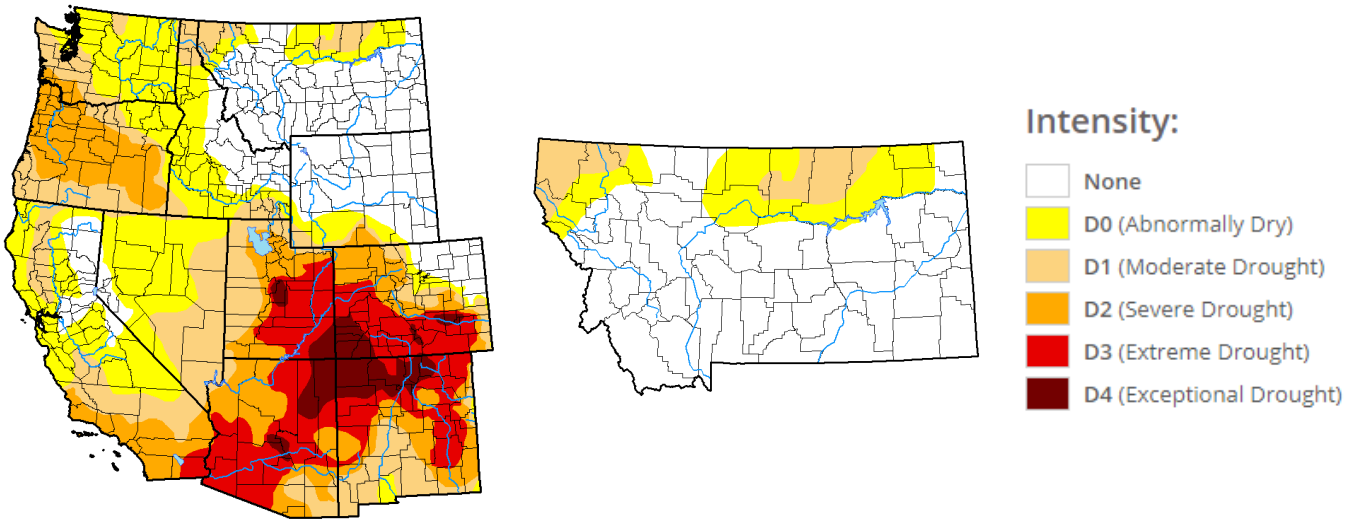

Figure 5: Latest Drought Monitor for the western U.S. (left) and Montana (right) released Thursday August 2, 2018.

U.S. & Global Climate Highlights (May): The latest U.S. and global climate highlights for May 2018 are now available. A few points for you to take home are provided below.

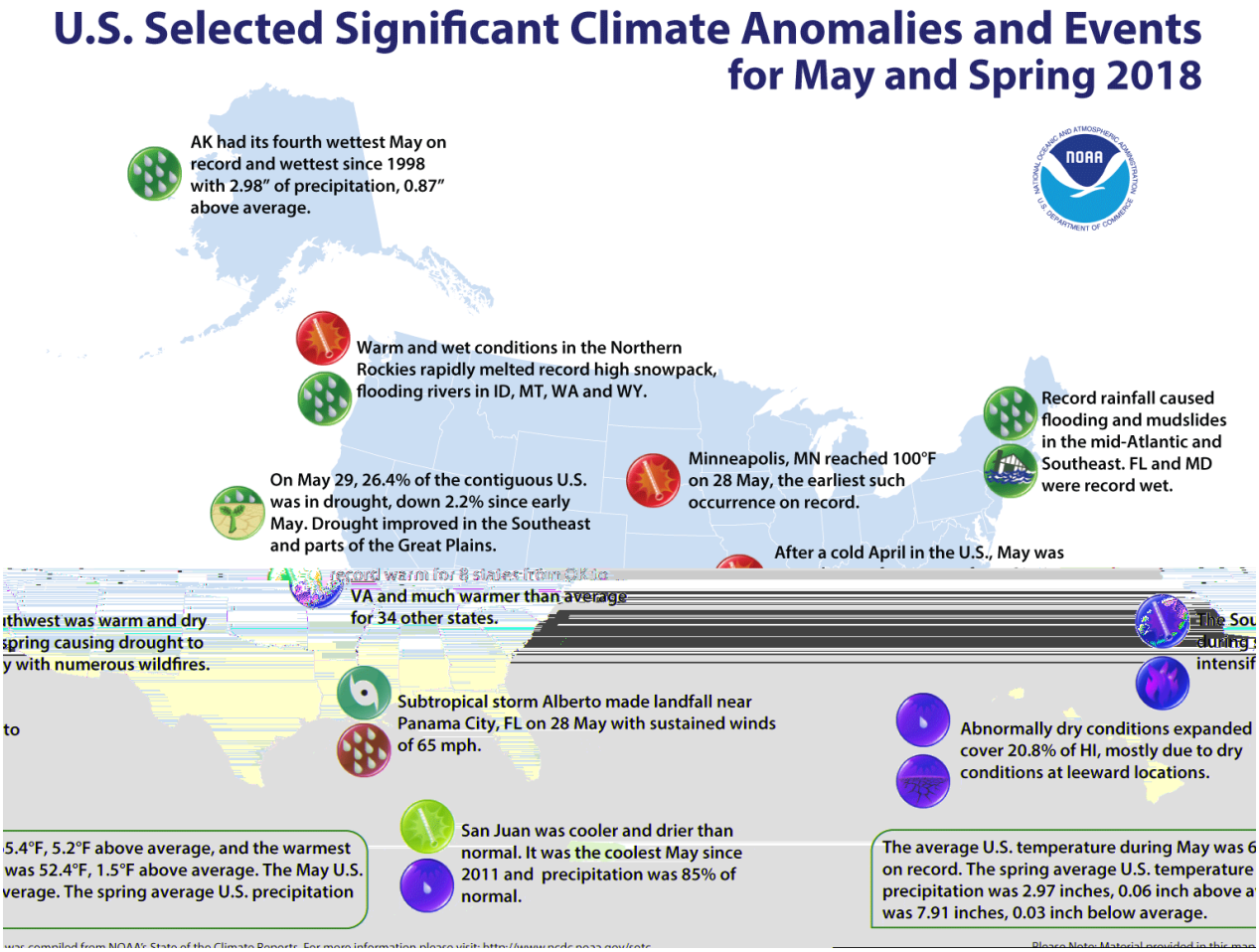

Figure 6: Climate Highlights for May and Spring of 2018.

U.S. Highlights for May 2018

1) The contiguous U.S. average temperature for May 2018 was 65.4 °F. This is a new record, beating the 64.7 °F reading that occurred in 1934.
2) The average May precipitation total for the contiguous U.S. came in at 2.97 inches, or 0.06 inch above the normal.
3) According to the U.S. Drought Monitor, 26.4% of the contiguous U.S. was in drought.

Global Highlights for May 2018

1) The average temperature across global land and ocean surfaces was the 4th highest on record.
2) The global oceans also had their fourth warmest May temperatures on record.
3) ENSO-Neutral conditions prevailed in May and are expected to continue through the summer months in the Northern Hemisphere.

U.S. & Global Climate Highlights (June): The latest U.S. and global climate highlights for June 2018 are now available. A few points for you to take home are provided below.

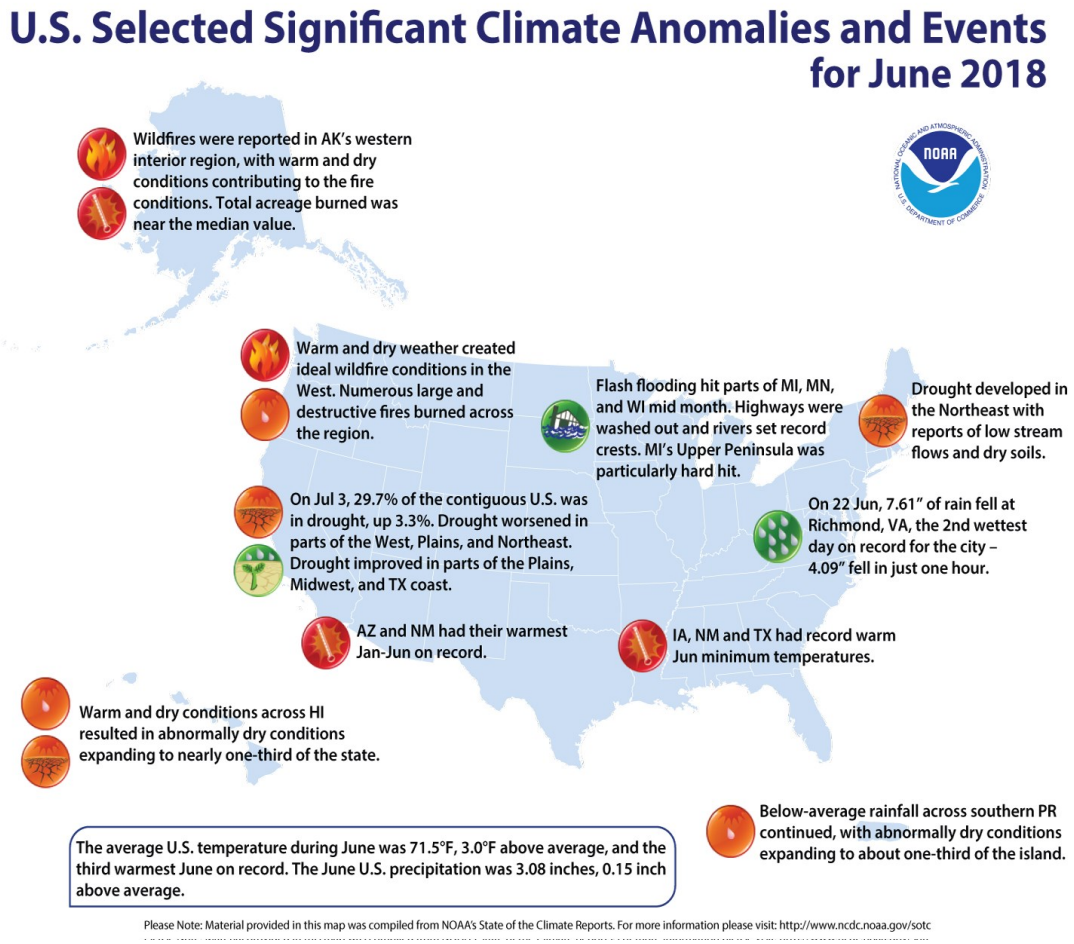

Figure 7: Climate Highlights for June of 2018.

U.S. Highlights for June 2018

1) The contiguous U.S. average temperature for June 2018 was 71.5 °F. This was the 3rd warmest June on record.
2) The average June precipitation total for the contiguous U.S. came in at 3.08 inches, or 0.15 inch above the normal.
3) According to the U.S. Drought Monitor, 29.7% of the contiguous U.S. was in drought.

Global Highlights for June 2018

1) The average temperature across global land and ocean surfaces was the 5th highest on record.
2) The global oceans also had their sixth warmest June temperatures on record.
3) ENSO-Neutral conditions prevailed in June and are expected to continue through the summer months in the Northern Hemisphere. El Niño conditions are favored in September to November 2018.

May Report of Hydrologic Conditions by Greg Forrester, Lead Forecaster at NWS Glasgow:

May was a much warmer than normal month across northeast Montana. Most locations had temperatures that were between 5 and 8 degrees above normal for the month. Glasgow averaged 62.7 degrees which was 7.6 degrees above normal.

It was a wetter than normal month south of the Missouri River and drier than normal to the north. The wet spots included Lindsay with 4.80 inches, Savage with 4.54 inches, and Mosby with 4.49 inches. The dry spots were Hinsdale 21SW with 0.40 inch, Port of Morgan with 0.53 inch, and Whitewater with 0.86 inch. Glasgow had 1.47 inches which was 77 percent of normal. The northeast corner of the state remained in moderate drought at the end of May.

Snow melt flooding that started on the Milk River continued into early May mainly downstream from Malta. The flooding on the Milk River ended on May 7.

Stream flow on the Milk and Poplar Rivers was well above normal the first half of May. The flow diminished to near normal by the end of the month. The flow on the Yellowstone and Missouri Rivers was well above normal for the entire month.

The Fort Peck Reservoir elevation rose to 2244.41 feet. The reservoir was at 92 percent of capacity and 116 percent of the mean pool.

June Report of Hydrologic Conditions by Greg Forrester, Lead Forecaster at NWS Glasgow:

June was a warmer than normal month across Northeast Montana. Most locations had temperatures that were between 1 and 4 degrees above normal for the month. Glasgow averaged 67.1 degrees which was 3.1 degrees above normal.

It was a wetter than normal month south of the Missouri River and drier than normal to the north. The wet spots included Brusett with 4.88 inches, Flatwillow with 4.83 inches, and Mosby with 4.16 inches. The dry spots were Port of Morgan with 0.50 inch, Saco with 1.30 inches, and Glasgow with 1.62 inches which was 70 percent of normal. With the dry weather, moderate drought developed in June across Phillips County.

Heavy rain produced flooding along the Mussellshell River on June 1 and 2. Stream flow on the Milk River was below normal for the month. Stream flow on the Poplar River was near normal in June. The flow on the Yellowstone and Missouri Rivers were well above normal for the entire month.

The Fort Peck Reservoir elevation rose to 2247.49 feet. The reservoir was at 97 percent of capacity and 121 percent of the mean pool.

Precipitation Data (May):

Station	Precipitation	Location
BAYM8	3.37	Baylor
BRDM8	1.64	Bredette
BTNM8	3.20	Brockton 17 N
BKNM8	3.42	Brockton 20 S
BKYM8	2.71	Brockway 3 WSW
BRSM8	2.33	Brusette
CLLM8	1.92	Carlyle 13 NW
CIRM8	3.34	Circle
CHNM8	2.51	Cohagen
COM8	3.76	Cohagen 22 SE
CNTM8	1.13	Content 3 SSE
CULM8	1.85	Culbertson
DSNM8	0.79	Dodson 11 N
FLTM8	4.42	Flatwillow 4 ENE
FPKM8	3.19	Fort Peck PP
GLAM8	M	Glasgow 14 NW
GGWM8	1.47	Glasgow WFO
GGSM8	1.38	Glasgow 46 SW
GNDM8	4.45	Glendive WTP
HRBM8	M	Harb
HINM8	0.99	Hinsdale 4 SW
HNSM8	0.40	Hinsdale 21 SW
HOMM8	1.75	Homestead 5 SE
HOYM8	4.47	Hoyt
JORM8	M	Jordan
LNDM8	4.80	Lindsay
MLAM8	0.98	Malta
MLTM8	1.28	Malta 7 E
MTAM8	1.53	Malta 35 S

Station	Precipitation	Location
MDCM8	2.75	Medicine Lake 3 SE
MLDM8	3.00	Mildred 5 N
MSBM8	4.49	Mosby 4 ENE
OPNM8	3.49	Opheim 10 N
OPMM8	1.11	Opheim 12 SSE
PTYM8	1.50	Plentywood
	1.30	Plentywood 1 NW
POGM8	0.38	Port of Morgan
RAYM8	1.32	Raymond Border Station
SAOM8	1.04	Saco 1 NNW
SMIM8	2.50	St. Marie
SAVM8	4.54	Savage
SCOM8	1.35	Scobey 4 NW
SDYM8	3.91	Sidney
SIDM8	3.25	Sidney 2S
TERM8	4.11	Terry
TYNM8	3.42	Terry 21 NNW
VIDM8	3.48	Vida 6 NE
WSBM8	1.75	Westby
WTRM8	0.86	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	0.99	Wibaux 2 E
WTTM8	3.49	Winnett
WNEM8	3.62	Winnett 6 NNE
WNTM8	4.07	Winnett 8 ESE
WITM8	3.77	Winnett 12 SW
WLFM8	2.29	Wolf Point
ZRTM8	2.21	Zortman

Links You May Like:

[El Niño Watch]

[Sea Turtle Week]

[Melting Antarctic Sea Ice & Minke Whales (Video)]

[CO2 Levels Crush New Milestone]

[Northern High Plains Expects Fewer Dust Storms]

Precipitation Data (June):

Station	Precipitation	Location
BAYM8	1.66	Baylor
BRDM8	2.22	Bredette
BTNM8	1.69	Brockton 17 N
BKNM8	4.56	Brockton 20 S
BKYM8	2.74	Brockway 3 WSW
BRSM8	4.88	Brusette
CLLM8	2.91	Carlyle 13 NW
CIRM8	3.65	Circle
CHNM8	2.65	Cohagen
COM8	2.99	Cohagen 22 SE
CNTM8	1.92	Content 3 SSE
CULM8	2.71	Culbertson
DSNM8	2.73	Dodson 11 N
FLTM8	4.83	Flatwillow 4 ENE
FPKM8	2.39	Fort Peck PP
GLAM8	M	Glasgow 14 NW
GGWM8	1.62	Glasgow WFO
GGSM8	2.87	Glasgow 46 SW
GNDM8	3.03	Glendive WTP
HRBM8	M	Harb
HINM8	1.95	Hinsdale 4 SW
HNSM8	2.00	Hinsdale 21 SW
HOMM8	3.99	Homestead 5 SE
HOYM8	2.18	Hoyt
JORM8	3.81	Jordan
LNDM8	3.94	Lindsay
MLAM8	1.75	Malta
MLTM8	1.85	Malta 7 E
MTAM8	1.87	Malta 35 S

Station	Precipitation	Location
MDCM8	3.65	Medicine Lake 3 SE
MLDM8	3.79	Mildred 5 N
MSBM8	4.16	Mosby 4 ENE
OPNM8	0.68	Opheim 10 N
OPMM8	1.77	Opheim 12 SSE
PTYM8	0.62	Plentywood
PTWM8	3.45	Plentywood 1 NW
POGM8	0.50	Port of Morgan
RAYM8	2.76	Raymond Border Station
SAOM8	0.97	Saco 1 NNW
SMIM8	1.73	St. Marie
SAVM8	4.12	Savage
SCOM8	3.07	Scobey 4 NW
SDYM8	2.18	Sidney
SIDM8	3.33	Sidney 2S
TERM8	2.87	Terry
TYNM8	2.42	Terry 21 NNW
VIDM8	2.55	Vida 6 NE
WSBM8	2.90	Westby
WTRM8	1.90	Whitewater
WHIM8	M	Whitewater 18 NE
WBXM8	3.16	Wibaux 2 E
WTTM8	M	Winnett
WNEM8	2.73	Winnett 6 NNE
WNTM8	3.08	Winnett 8 ESE
WITM8	3.52	Winnett 12 SW
WLFM8	2.01	Wolf Point
ZRTM8	2.72	Zortman

Boating Safety Reminders: There is still time this summer to make it out to Fort Peck Lake for some boating as well as other fun recreational activities! The National Weather Service has a partnership with the National Boating Council aimed at promoting safe boating practices. Whether you're planning that weekend boating trip on Fort Peck Lake before the cool autumn weather approaches, or just making a day trip out on a nearby lake, here's some information on how you can stay safe.

Monthly Trivia: Last month we asked…

What causes different types of thunderstorms (i.e., squall lines, supercells, etc.)?

Answer: When the atmosphere becomes unstable, warm & moist air begins to rise. As it cools, towering cumulus will eventually evolve into cumulonimbus, the signature cloud formation of an ordinary cell or what we think of as general thunderstorms. With increasing amounts of wind shear (that is to say, how wind changes direction and/or speed with height), thunderstorms can evolve to take on different forms, especially as the updraft into the storm remains separated from the downdraft. These storms are often in the form of squall lines, rotating supercells, etc. From these storms in particular, damaging wind, hail, and on rare occasion tornadoes result. In short, what type of storm you get, and the threat associated with it, mainly depends on how unstable the air is, how much wind shear is present, as well as additional thermodynamic and environmental properties. It also helps to have something to force the air to rise in the first place such as a cold front, or dry line, etc. Regardless of whether or not a storm becomes severe, all storms are capable of producing dangerous cloud to ground lightning and heavy rainfall.

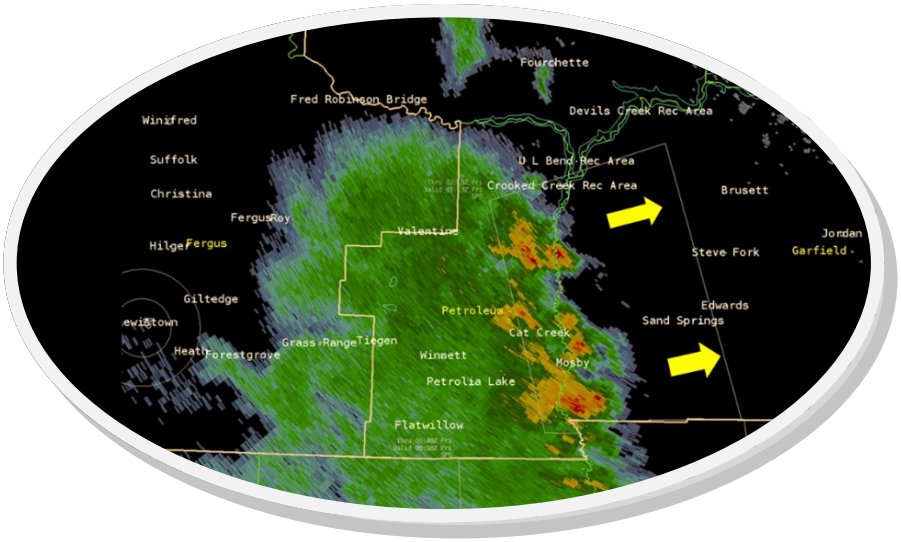

Figure 8: Radar image of an area of thunderstorms on June 21, 2018 producing locally heavy rain & gusty winds while tracking east into Western Garfield County.

New Question: July and August often come with some of the hottest summertime weather conditions across northeast Montana. Sometimes it can even feel warmer than the actual temperature, and we refer to something called a heat index to better help people understand how heat combined with humidity will impact them. What is the heat index, how is it used, and why does humidity factor into how hot it feels in the first place? Find out in the next newsletter!

Find us on Facebook, Twitter and YouTube! No account needed:
Facebook.com/NWSGlasgow
Twitter.com/NWSGlasgow
YouTube.com/NWSGlasgow