

The Month in Review: June 2021

National Weather Service

Charleston, WV

Photo courtesy of the National
Weather Service Charleston, WV



June 2021 Climate Summary

June was characterized by near normal, to slightly above normal temperatures across the region, with most locations generally finishing the month within a degree or two of their climatological average temperature for June. Precipitation totals varied significantly, with well below normal precipitation seen across portions of the area, such as parts of Southeast Ohio and Southern West Virginia, while other areas were well above normal, such as portions of North Central West Virginia. Parkersburg, West Virginia for instance, ended June with 6.97", or 2.53" above normal for the month of June! After an extremely quiet May across the region in terms of severe weather, June was quite the opposite, with multiple periods of active weather resulting in severe weather across the area. In fact, there were only 3 warnings issued in May (all being flash flood warnings), while in June there were 136 issued, with 3 being tornado warnings, 71 being severe thunderstorm warnings, and 62 being flash flood warnings.

June began rather quiet across the area, but this would not last long. Starting early on the morning of June 2nd, rounds of showers, and at times thunderstorms, would affect the region through the morning of June 4th, when a cold front would finally usher in quieter weather into the region. Luckily, there were only a few reports of tree damage, all in Kanawha County (WV). The area would then receive a brief break, meanwhile, a developing southeast ridge would begin funneling increasing heat and humidity northeastward, priming the area for an extended period of unsettled weather that would begin on June 6th, and last through June 15th. This timeframe would in fact be the most active period of the year (to date), in terms of severe weather, with daily showers and thunderstorms across the region. This resulted in numerous reports of flash flooding and of damaging winds, quite the opposite of the quiet and dry weather of May. High pressure would build into the region mid-month, bringing in cooler and drier weather, and providing a welcomed relief from an extended period of unsettled weather.

June 2021 Climate Summary (Continued)

After a few quiet and pleasant days across the region, increasing warmth and unsettled weather in the form of a few rounds of scattered showers and thunderstorms would move back in starting during the afternoon of June 18th, continuing through the morning of June 20th out ahead of a nearly stalled frontal boundary to the north. Most of the activity remained over the central and northern portions of the area and luckily was not of the severe variety, with locally heavy rainfall being the main impact. This would not be the case however the following day as a slow-moving cold front approached the area, resulting in numerous severe thunderstorms as well as some flash flooding during the afternoon and evening of June 21st. Many reports of tree damage from strong wind gusts were received, as well as reports of high water, with flooded roadways in some cases. Portions of Athens County in Ohio received rainfall amounts of 3-4"+ from approximately 4:00-7:30 PM!

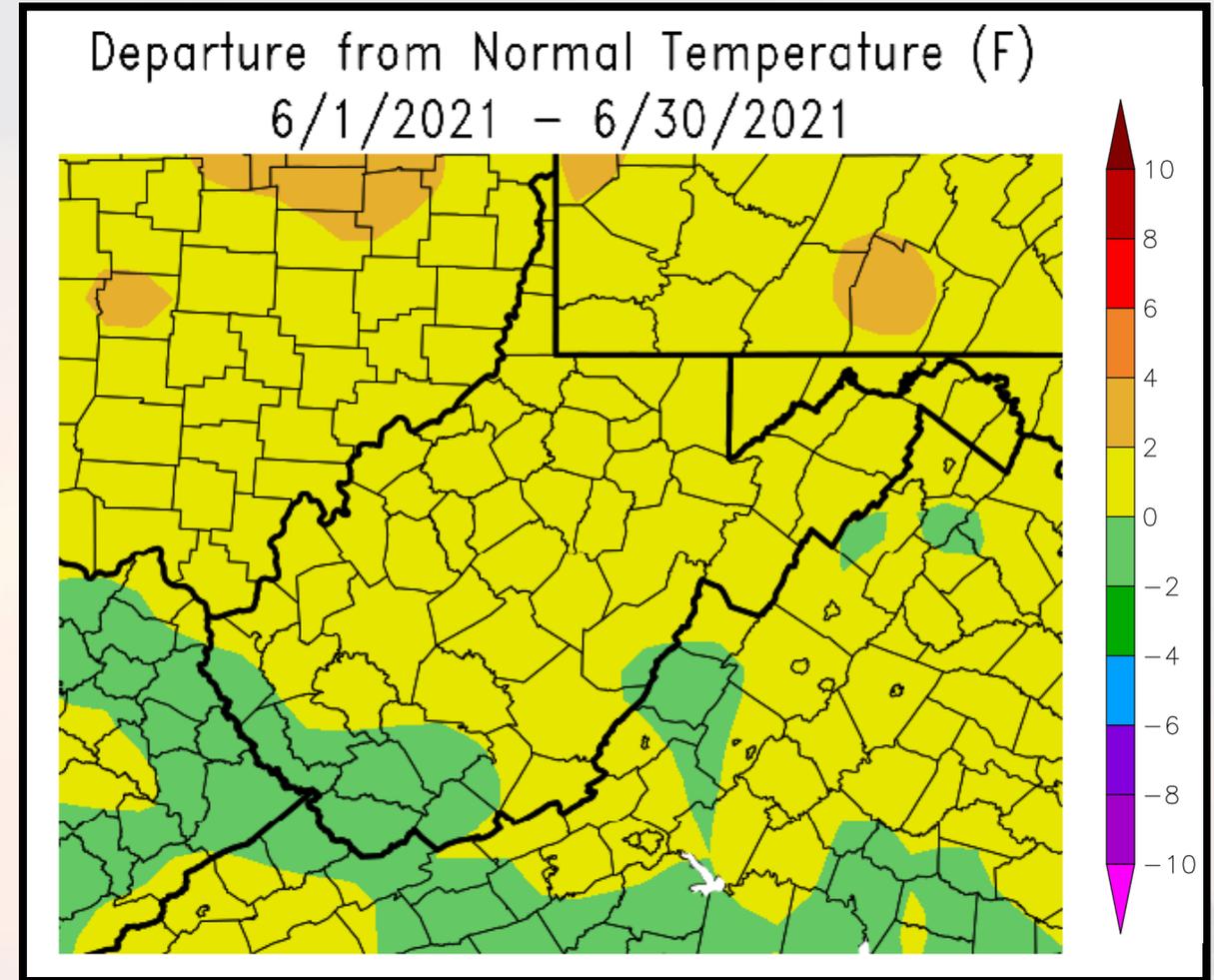
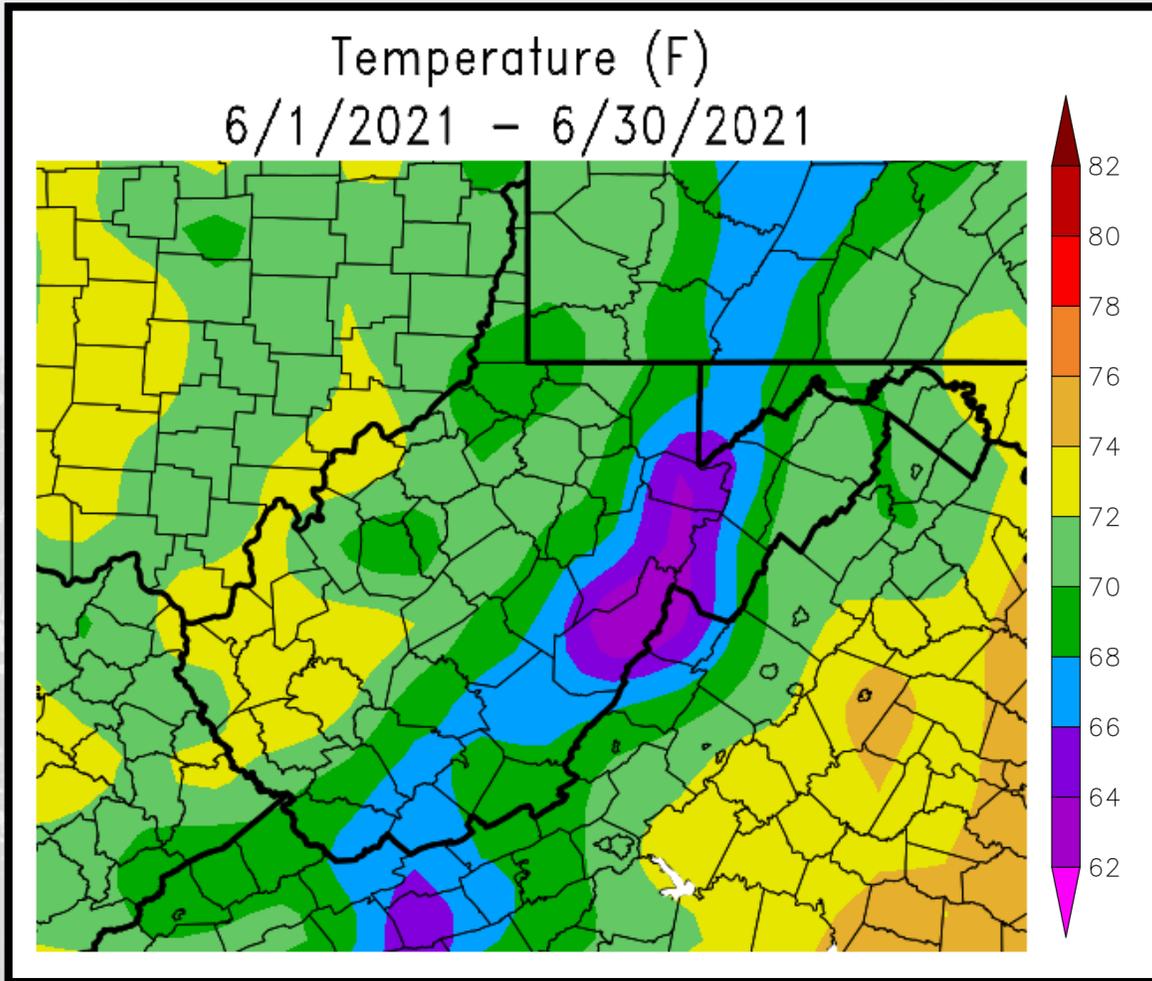
Following the passage of the cold front during the early morning of June 22nd, a period of cooler and quiet weather would move into the region courtesy of high pressure. A couple record low temperatures were even set on the morning of June 23rd at Huntington and Parkersburg. A return of warmer temperatures would begin on June 24th, but the area would remain dry until the 27th, when isolated to scattered diurnal showers and thunderstorms would return to the region (as well as on June 28th), courtesy of a more favorable airmass. There were a couple reports of hail (up to 1.00") on June 28th in Kanawha County (WV), but generally most of the thunderstorms remained below that of severe criteria, with gusty winds and locally heavy rainfall being the main impacts.

June 2021 Climate Summary (Continued)

Building high pressure would then result in a reduction of activity on June 29th, with scattered showers and thunderstorms returning on June 30th to close out the month in advance of an approaching cold front. There were a couple reports on June 30th of severe weather, with multiple trees reported down in Athens County (OH), along with a report of a tree falling onto vehicles in Parkersburg, WV. In addition, flash flooding due to heavy rainfall in the form of flooded roadways was reported in Athens, OH and also near Danville, WV. More rain was to come as the aforementioned cold front would move through the region to start the month of July. With all of this going on, it is important to note that late June finished on a very hot note across the region, with many areas at lower elevations having high temperatures in the low to mid 90s on June 28-29th.

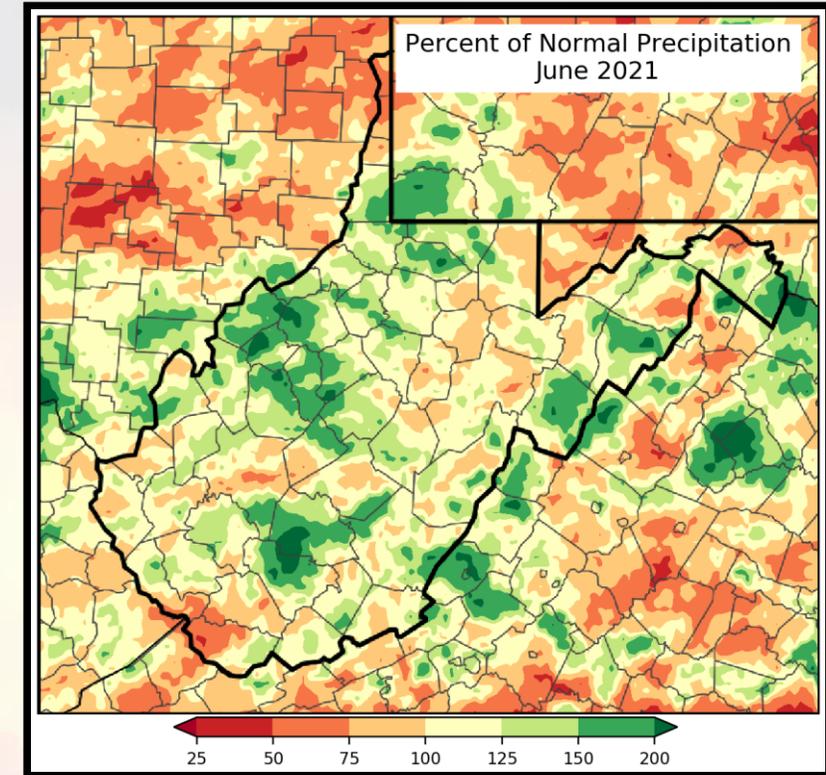
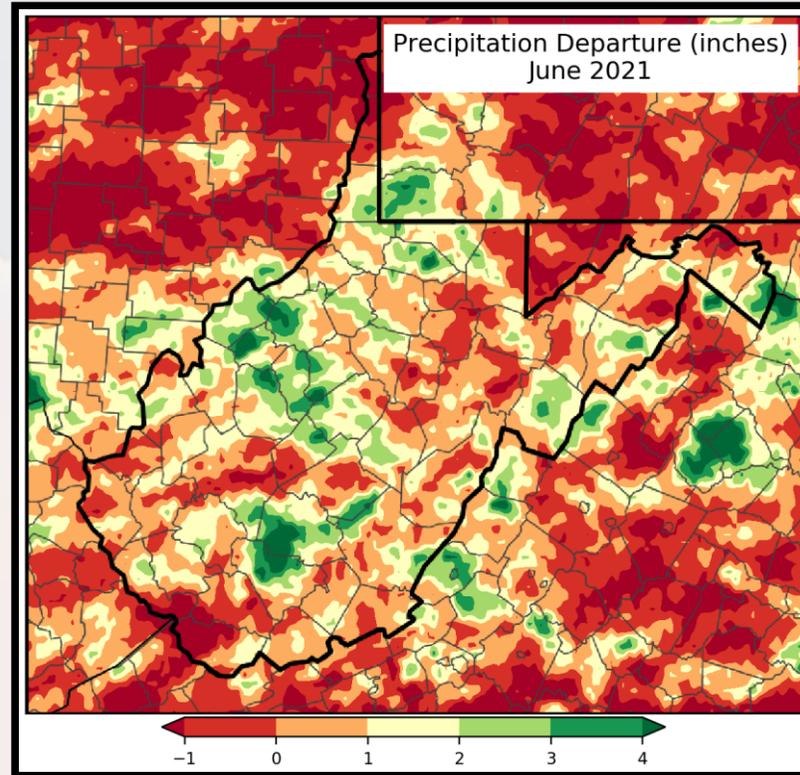
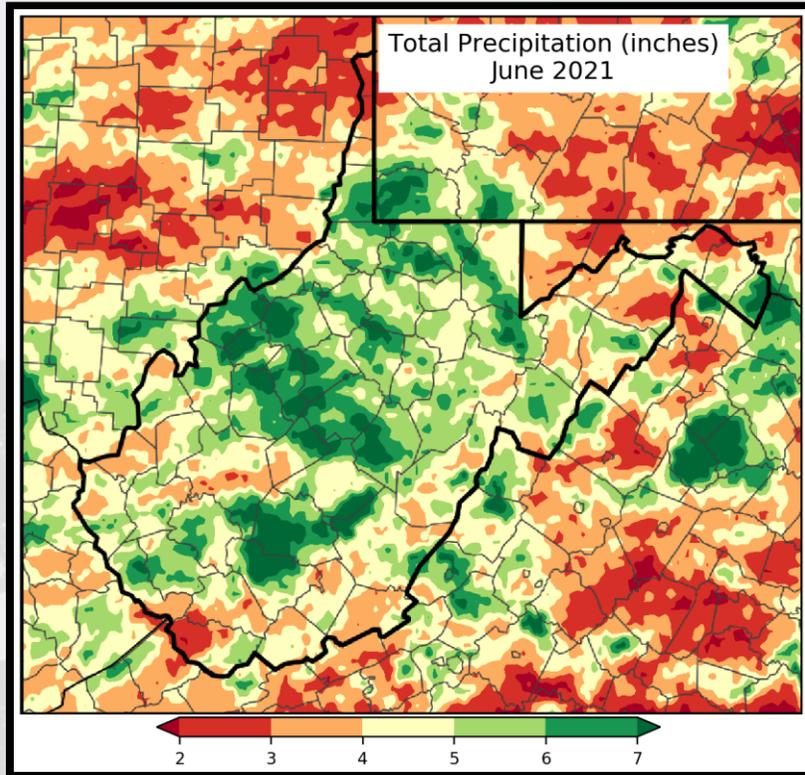
Event summaries for noteworthy events will be provided, along with temperature/precipitation departures for June. A record events list for the month of June, as well as temperature/precipitation outlooks are also included. In addition, precipitation statistics for the first half of 2021 will also be included in this edition.

June 2021 Average Temperature/Departure



By and large, average temperatures for June across the region were near normal, to slightly above normal, with most locations being within a degree or two of their climatological average temperature for the month.

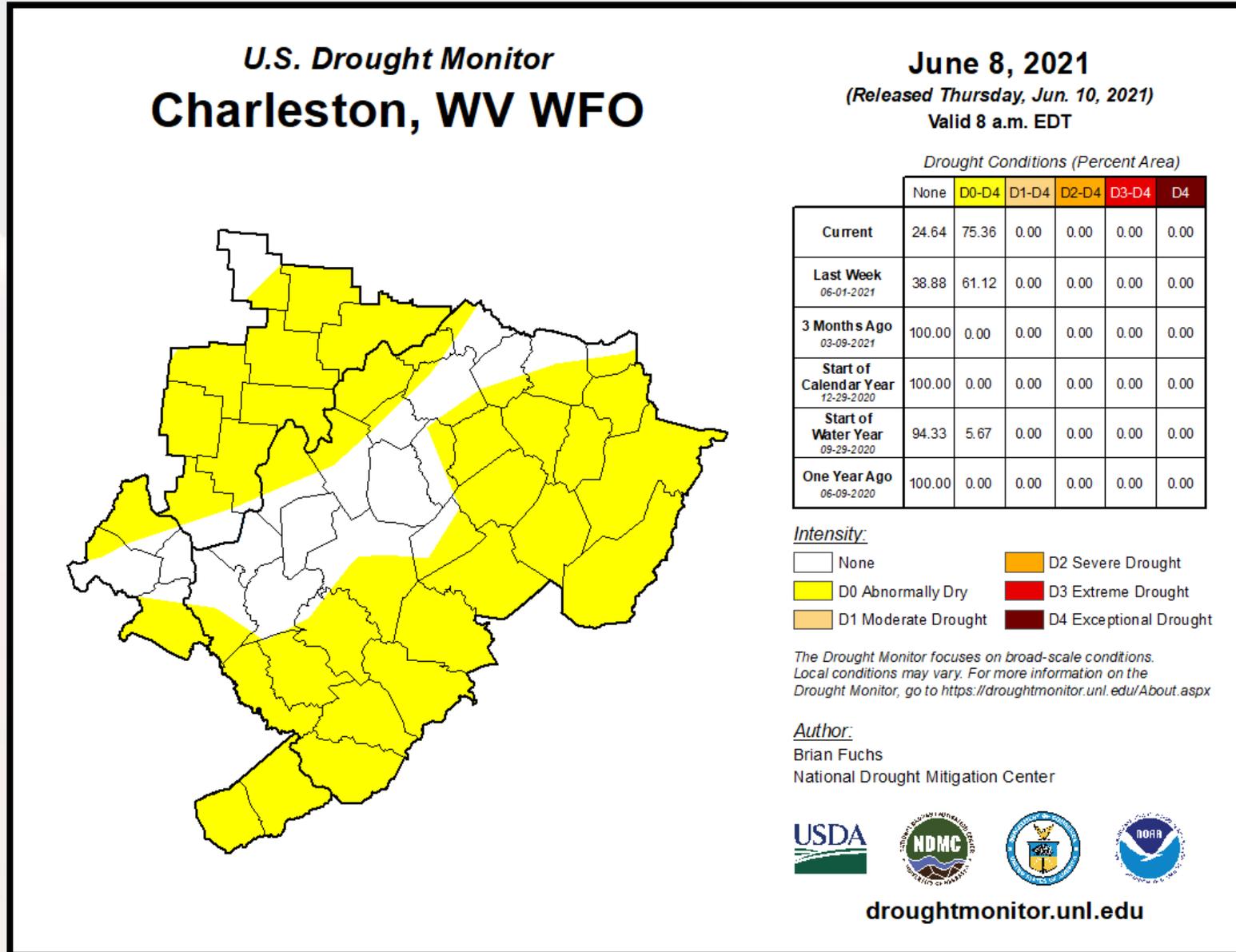
June 2021 Precipitation/Departure/Percent of Normal



June featured a significant spread in precipitation totals across the area which is not unusual during the summer months. Portions of North Central WV, as well as areas near and north of Beckley (WV), were particularly wet during June, with some isolated areas having over twice the normal amount of precipitation for the month. Other areas however, such as across portions of Southeast OH and far Southern WV, were well below normal for the month, with some locations receiving only 25-50% of normal precipitation. For example, Parkersburg (WV) received 6.97" for June, which was 2.53" above normal, while portions of Southeast OH less than an hour to the northwest were 1-2" below normal for the month!

June 2021 Drought Monitor

Rounds of showers and thunderstorms throughout June led to a reduction in the D0 (abnormally dry) area being present across the region by the end of the month. Shown right is when the area peaked in early June, encompassing approximately 75.4% of the area. Unsettled weather would follow this however, resulting in a significant reduction of this area as the month progressed, with just 3.0% of the area being in D0 by the end of June.



June 2021 Temperature Statistics for Selected Cities

	Avg Maximum Temperature	Avg Maximum Temperature Departure	Avg Minimum Temperature	Avg Minimum Temperature Departure	Average Temperature	Average Temperature Departure
Beckley	78.8	1.0	59.5	0.8	69.1	0.9
Charleston	83.5	0.4	61.9	0.4	72.7	0.4
Clarksburg	82.1	-0.4	60.6	0.4	71.3	0.0
Elkins	80.7	0.5	56.8	1.3	68.7	0.9
Huntington	83.1	-0.2	63.3	0.9	73.2	0.3
Parkersburg	82.9	0.8	61.6	1.7	72.3	1.3

Abbreviations: Avg, Average

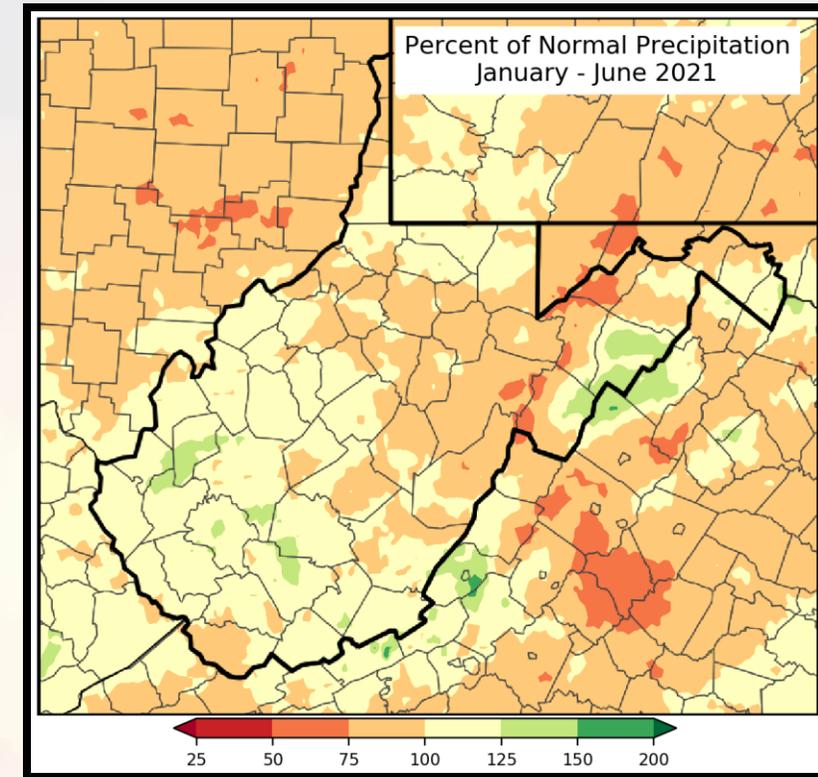
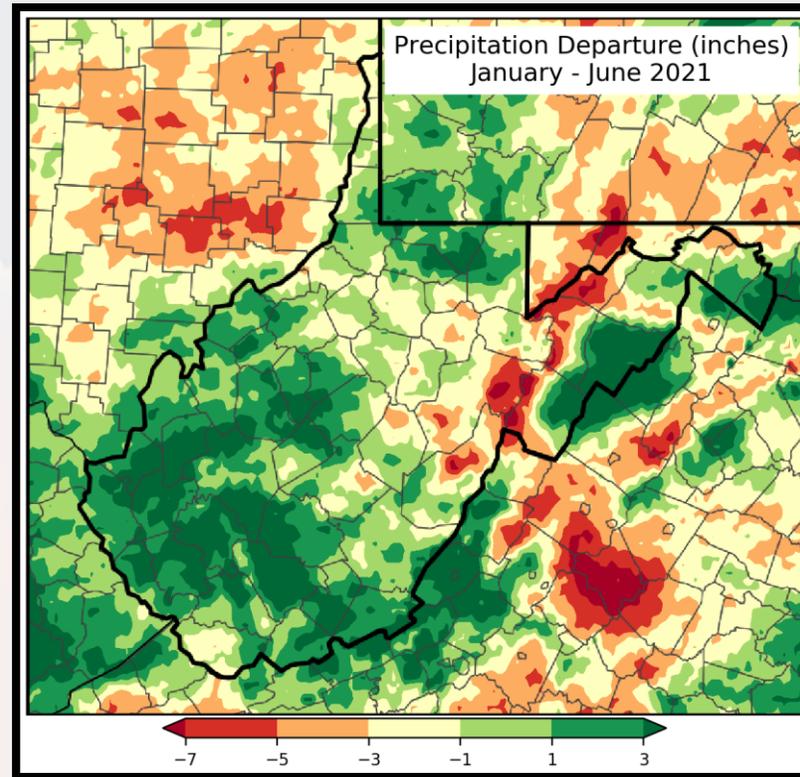
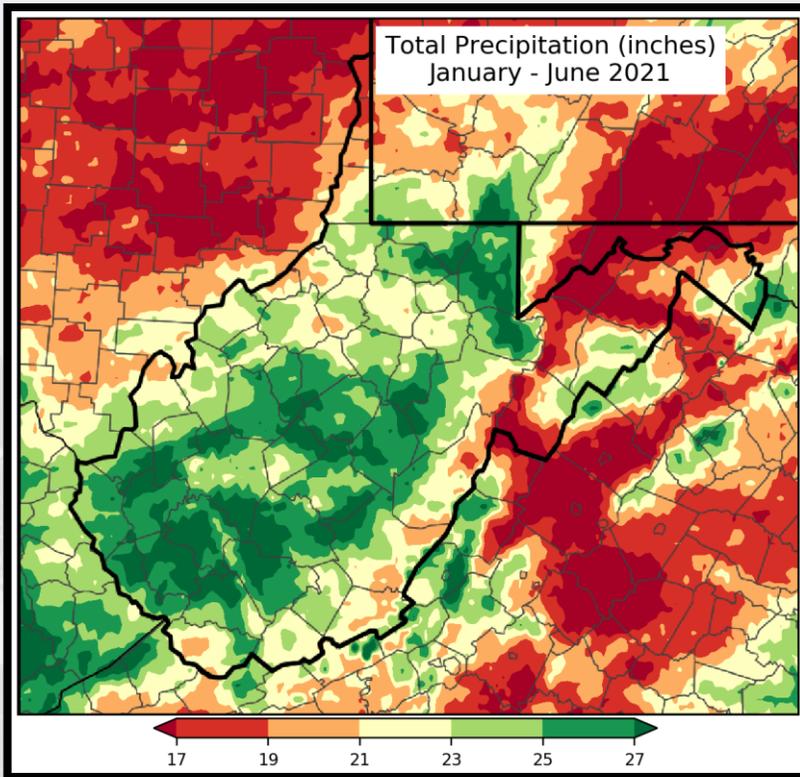
Notes: Temperatures/Departures are in degrees Fahrenheit

June 2021 Precipitation Statistics for Selected Cities

	Precipitation	Precipitation Departure	Precipitation Year to Date	Precipitation Year to Date Departure
Beckley	4.53	0.23	22.14	-0.70
Charleston	3.88	-0.84	20.13	-3.85
Clarksburg	4.75	0.21	18.75	-3.99
Elkins	4.34	-0.14	19.47	-4.85
Huntington	5.89	1.69	24.06	0.81
Parkersburg	6.97	2.53	22.85	0.57

Notes: All units are in inches. Precipitation Year to Date corresponds to precipitation since January 1st.

Year to Date Precipitation/Departure/Percent of Normal



Through the first half of 2021, precipitation totals across the region have varied significantly. In general, precipitation across the central and southern portion of the region has been significantly greater than that of the northern portions (far Northern WV and Southeast OH) of the region. For example, some areas in Central/Southern WV have had over 27" of precipitation through June, while portions of Southeast OH have had less than 17" of precipitation, over 10" less! This has resulted in portions of the area being slightly above normal for precipitation during the first 6 months of the year, while other areas (such as portions of SE OH) are significantly below normal thus far.

Record Events for June

- June 17th: Record low temperature set at Parkersburg, WV. A record low temperature of 47 degrees was set at Parkersburg, tying the old record of 47 degrees set in 1980.
- June 23rd: Record low temperature set at Huntington, WV. A record low temperature of 47 degrees was set at Huntington, tying the old record of 47 degrees set in 1915.
- June 23rd: Record low temperature set at Parkersburg, WV. A record low temperature of 46 degrees was set at Parkersburg, breaking the old record of 48 degrees set in 1972.

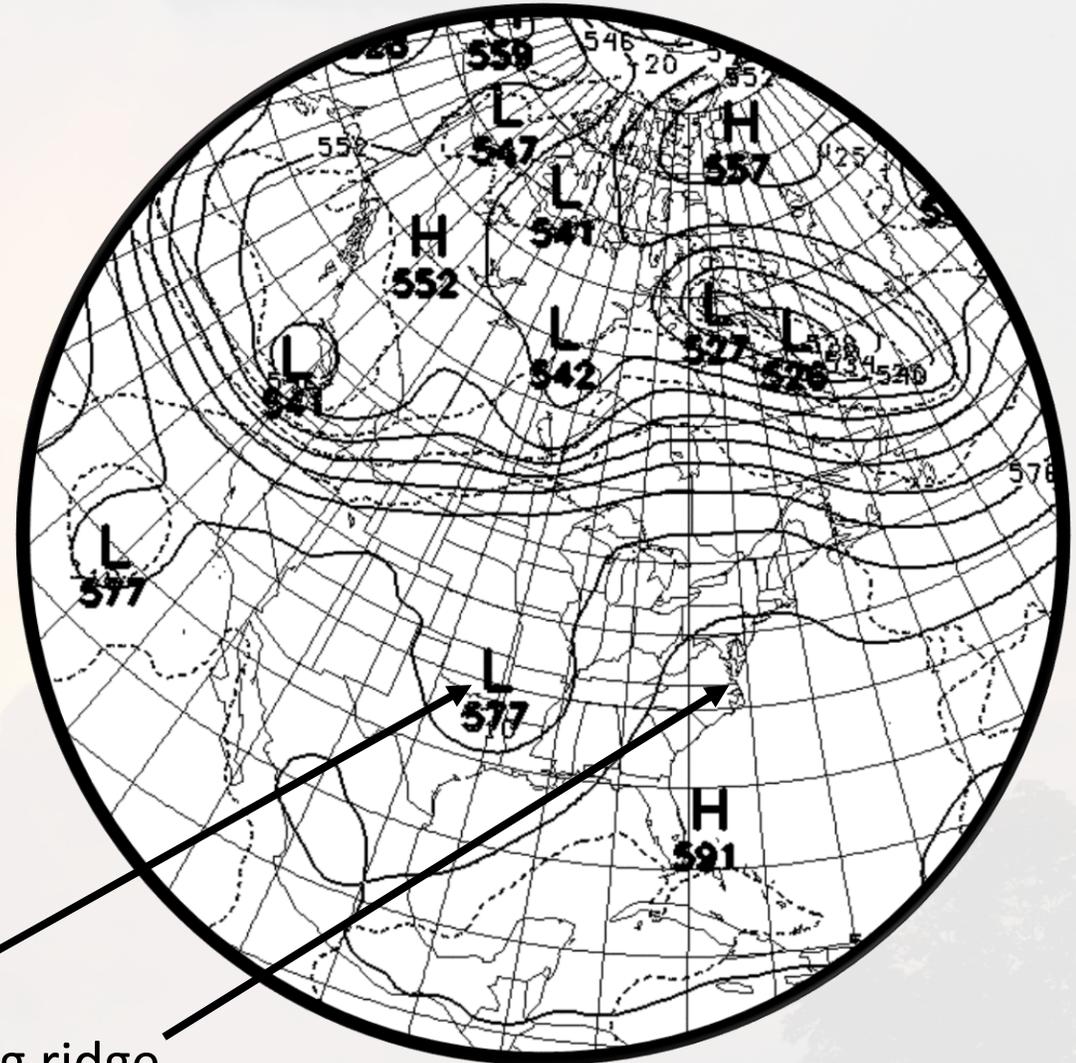
June Noteworthy Events

- June 6-15th Extended Unsettled Period (Heavy Rainfall, Flash Flooding, and Severe Weather)
- June 21st Heavy Rainfall, Flash Flooding, and Severe Weather
- June 28-29th Heat Wave
- June 30th - July 2nd Heavy Rainfall, Flash Flooding, and Severe Weather (Will be covered in July's edition!)

June 6-15th Extended Unsettled Period (Heavy Rainfall, Flash Flooding, and Severe Weather)

A developing southeast ridge would begin funneling increasing heat and humidity into the region on June 5th, with diurnal showers and thunderstorms starting across the area on June 6th. Diurnal showers and thunderstorms, aided by an approaching and slow-moving upper level low, would then continue over the next several days across the region. Luckily, neither severe weather or flooding was an issue at first, given the relatively dry conditions across the area at the time. Repeated rounds of rainfall did eventually lead to localized water issues by the evening of June 8th, with a few flash flood warnings being issued. 4.49" was reported in Bradley, WV (Raleigh County) on June 7th from approximately 3-8:30 PM!

500 mb analysis for the evening of June 6th illustrating an approaching upper level low, while across the Southeast US is an amplifying ridge.



June 6-15th Extended Unsettled Period (Continued)

As the upper level low moved closer on June 9th, rainfall coverage across the region increased, with several more flash flood warnings being issued. With the upper low remaining over the region on June 10th and June 11th, diurnal showers and thunderstorms would continue. A backdoor cold front approaching the region from the northeast on the evening of June 11th would help to enhance showers and thunderstorms across portions of the area. After several days of rainfall, flash flood guidance across the area had been reduced significantly, resulting in many areas not needing much in terms of rainfall for flooding to begin. As a result, flash flooding across portions of the area was quite prevalent, with a total of 18 flash flood warnings being issued on June 10th, and another 19 issued on June 11th. Incident reports included numerous flooded roadways (with some washed out), mudslides, vehicle rescues, as well as flooded homes, with some being destroyed. To the right is a list showing 72-hour rainfall totals ending around noon on June 10th, with some locations having received 3-4"+ already, with more to come. One particularly impressive report was received from St. Albans, WV (Kanawha County) on the evening of June 10th, where 1.8" fell in 30 minutes!

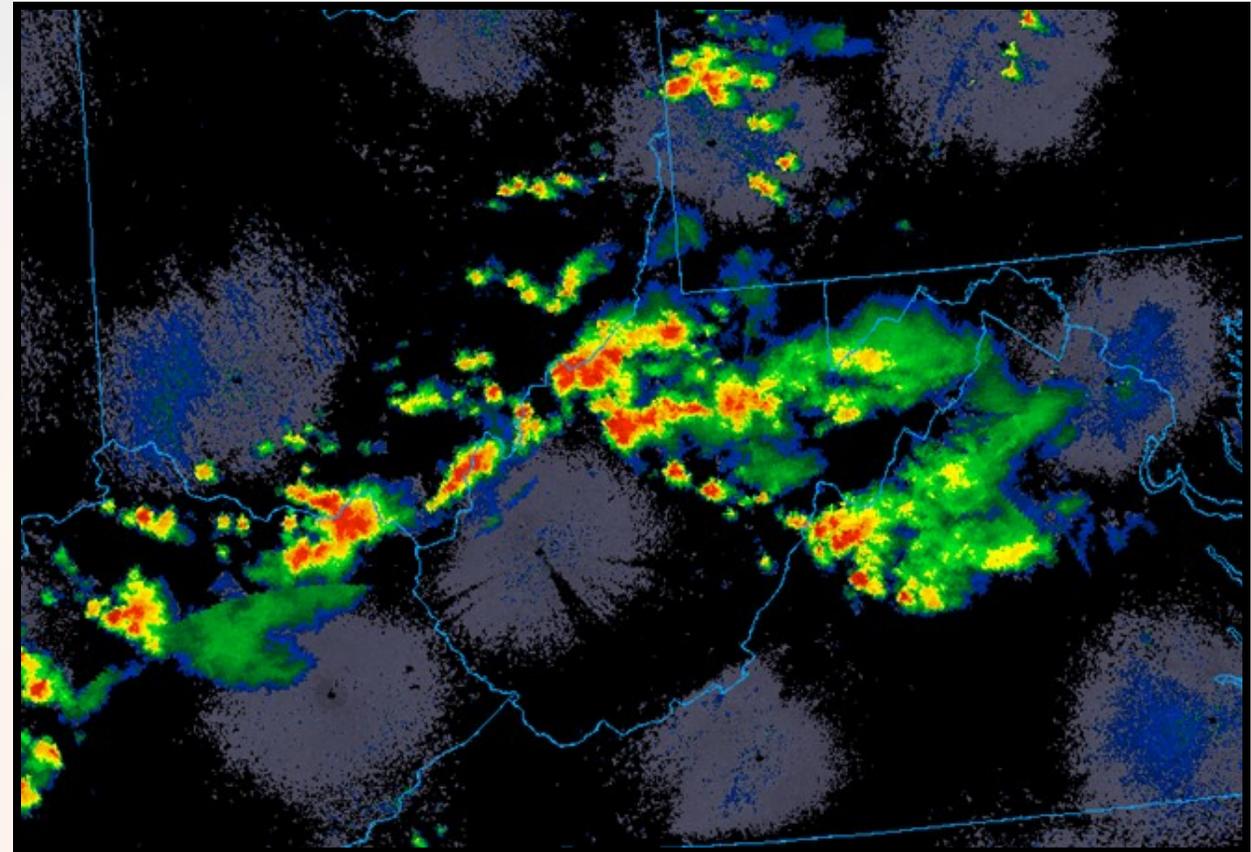
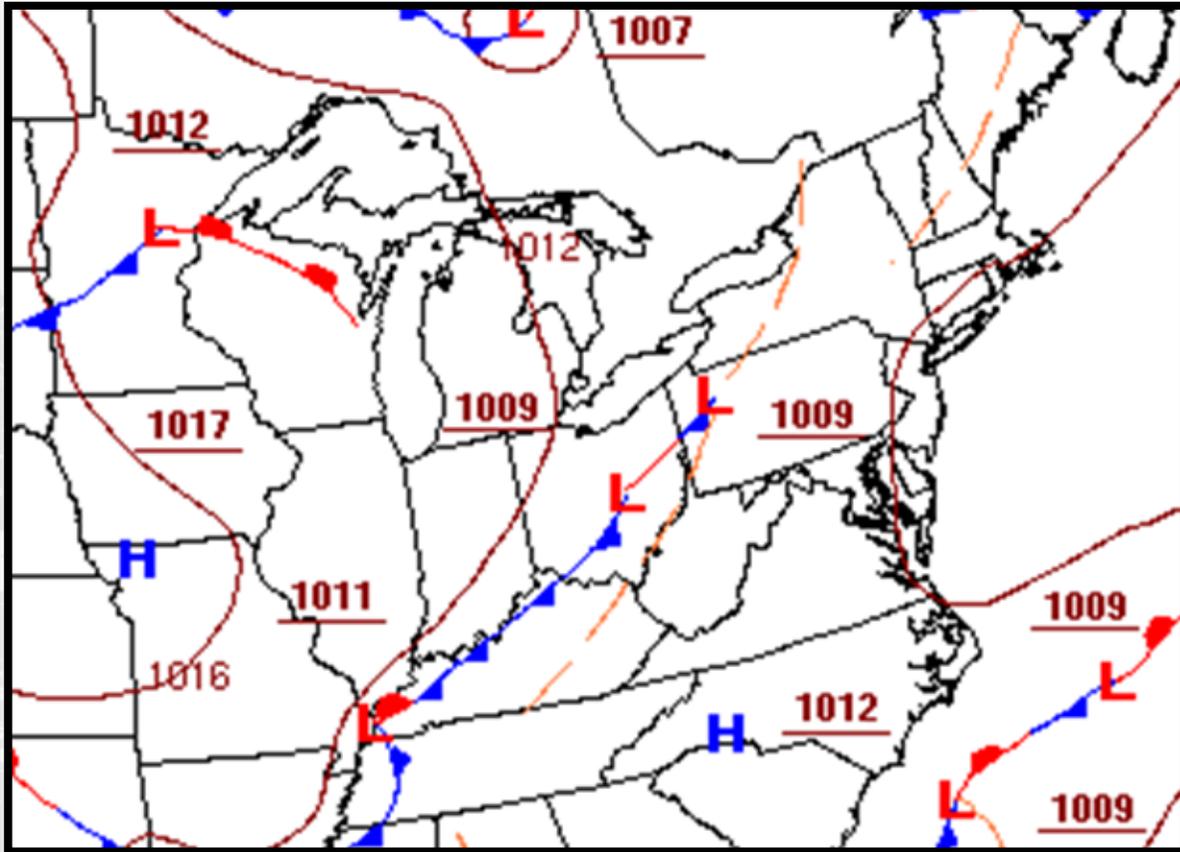
...SELECT 72-HOUR RAINFALL TOTALS...

Location	Amount	Time/Date
Grandview	4.48 in	1105 AM 06/10
Beckley	3.23 in	1207 PM 06/10
5.8 NW Cass Scenic Railro	3.16 in	1100 AM 06/10
4.6 N Dye	3.04 in	1200 PM 06/10
8.5 E Crown City	2.95 in	0900 AM 06/10
Gallipolis	2.95 in	0830 AM 06/10
Olive Hill 5 NE	2.93 in	0754 AM 06/10
4.7 E Carter Caves State Par	2.80 in	1200 PM 06/10
11.0 NE Clendenin	2.74 in	0800 AM 06/10
Waterloo	2.68 in	0700 AM 06/10
1.5 NE John Flannagan Lake	2.65 in	1200 PM 06/10
Dean	2.64 in	1112 AM 06/10
Ravenswood	2.61 in	1206 PM 06/10
3.4 NW Reedy	2.56 in	0600 AM 06/10
John Flannagan Lake	2.53 in	1130 AM 06/10
Clintwood	2.50 in	1205 PM 06/10
Poca	2.45 in	1137 AM 06/10
Spencer	2.40 in	0500 AM 06/10
5.8 E Leon	2.39 in	0600 AM 06/10
Ashland Airport	2.38 in	1156 AM 06/10
Glen Jean 0.3 W	2.38 in	0800 AM 06/10
6.9 E Bruin	2.36 in	1145 AM 06/10
Salem Center 2 E	2.32 in	0700 AM 06/10
Parkersburg	2.24 in	1205 PM 06/10
9.2 S Mineralwells	2.24 in	0800 AM 06/10
Huntington Airport	2.07 in	1151 AM 06/10
Gallipolis 2.9 NW	2.04 in	0900 AM 06/10
8.0 W Glen Daniel	2.00 in	0900 AM 06/10
Hacker Valley	1.91 in	0715 AM 06/10
3.9 NW Wenonah	1.87 in	1200 PM 06/10
Logan	1.87 in	0700 AM 06/10
Mount Hope 2.8 NE	1.85 in	0700 AM 06/10
5.0 W Gallipolis	1.79 in	1200 PM 06/10
Parkersburg	1.77 in	1200 PM 06/10
0.9 N Henderson	1.76 in	1200 PM 06/10
Ripley 5.8 S	1.76 in	0700 AM 06/10
Point Pleasant 5.8 E	1.72 in	0730 AM 06/10
2.1 S Craigsville	1.71 in	1130 AM 06/10
3.9 W Arnoldsburg	1.68 in	0500 AM 06/10
2.2 SE Toonerville	1.67 in	1130 AM 06/10
0.9 NW Wayne	1.66 in	1200 PM 06/10
Logan	1.63 in	1114 AM 06/10
Parkersburg	1.63 in	0700 AM 06/10
8.8 E Holly River State	1.62 in	1145 AM 06/10
2.0 NW Gary	1.60 in	1145 AM 06/10
Sissonville 1 SW	1.60 in	0700 AM 06/10
Beech Fork	1.57 in	1114 AM 06/10
Ashland	1.55 in	1205 PM 06/10
Birch River	1.51 in	1130 AM 06/10
Warnock	1.51 in	0645 AM 06/10
Craigsville 0.6 NE	1.50 in	0700 AM 06/10

June 6-15th Extended Unsettled Period (Continued)

The region would receive a brief break on June 12th as the upper low moved southeastward away from the area, but active weather would quickly move back in on June 13th due to an approaching cold front. With ample instability across the region, thunderstorms began to develop out ahead of and along the approaching cold front during the afternoon of June 13th in Northern WV and Southeast OH, with many storms quickly becoming severe (with mainly wind damage) as they progressed northwest to southeast across the area during the afternoon and evening hours. Flash flooding was once again an issue as well due to the rainfall over the course of the preceding week, with some isolated areas receiving over 3" of rain during the afternoon/evening of June 13th. 1.91" was reported near Warnock, KY (Greenup County) in 30 minutes from 5-5:30 PM, while Glenville, WV (Gilmer County) reported 2.6" in an hour from 4:40-5:40 PM! In total, 11 flash flood warnings were issued, as well as 35 severe thunderstorm warnings, making it the most active day of the year thus far in terms of severe weather across the region. Incident reports included flooded roadways (some washed out), a water rescue (Frost, WV – Pocahontas County), mudslides, numerous reports of trees down (with one person reported injured), power lines down, hail (up to 1"), as well as some property damage. Graphics for this event can be seen on the next page.

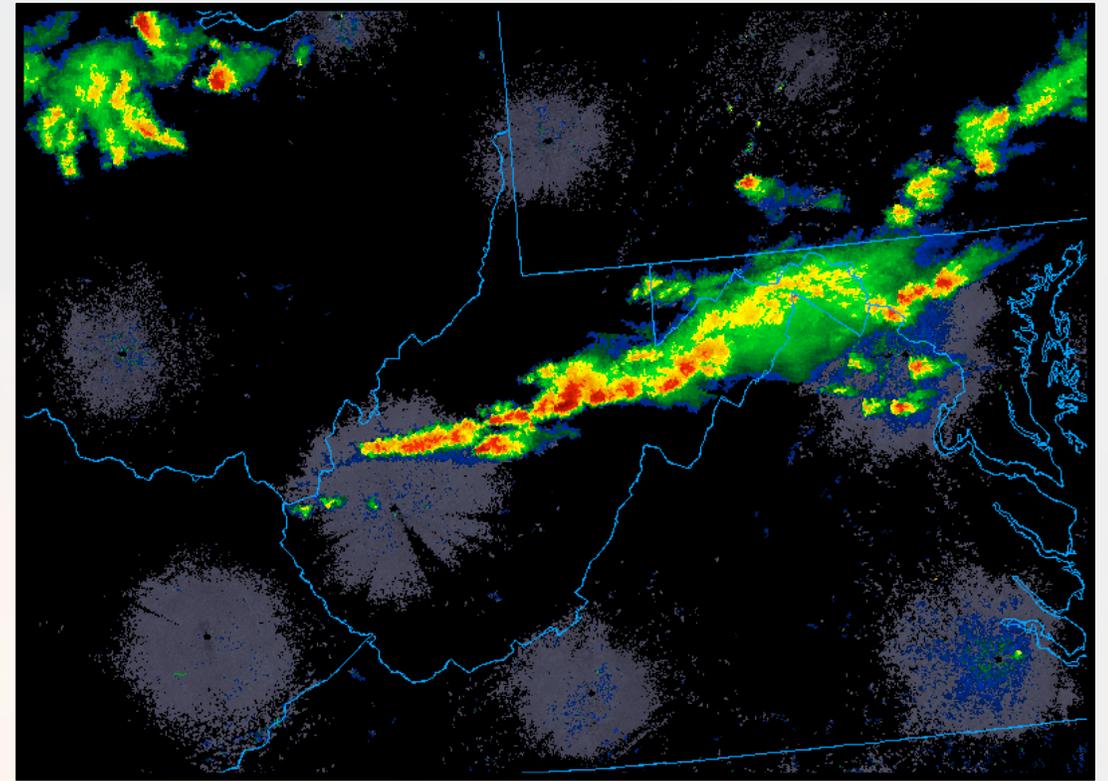
June 6-15th Extended Unsettled Period (Continued)



On the left is a surface analysis chart for June 13th at 5 PM showing the cold front approaching the area, while on the right (at the same time) is the composite radar mosaic.

June 6-15th Extended Unsettled Period (Continued)

One more wave of active weather would affect the area on the evening of June 14th as a reinforcing cold front moved through. Thunderstorms would begin to blossom across Southeast Ohio around 5 PM, quickly becoming severe (mainly with damaging winds), as they moved southeast into and through West Virginia during the evening in a single wave. In total, an additional 10 severe thunderstorm warnings were issued that evening, as well as one flash flood warning. Incident reports included numerous trees down (and some power lines), hail (up to 1.00"), and some flooded roadways and businesses. Scattered showers and isolated storms would occur the following day as a weak upper level disturbance crossed the area, but all activity would be of the non-severe variety, with fair weather to follow. This would mark the conclusion to a very active ten days across the region, in fact, significantly more active than the entire rest of the year up until that point.



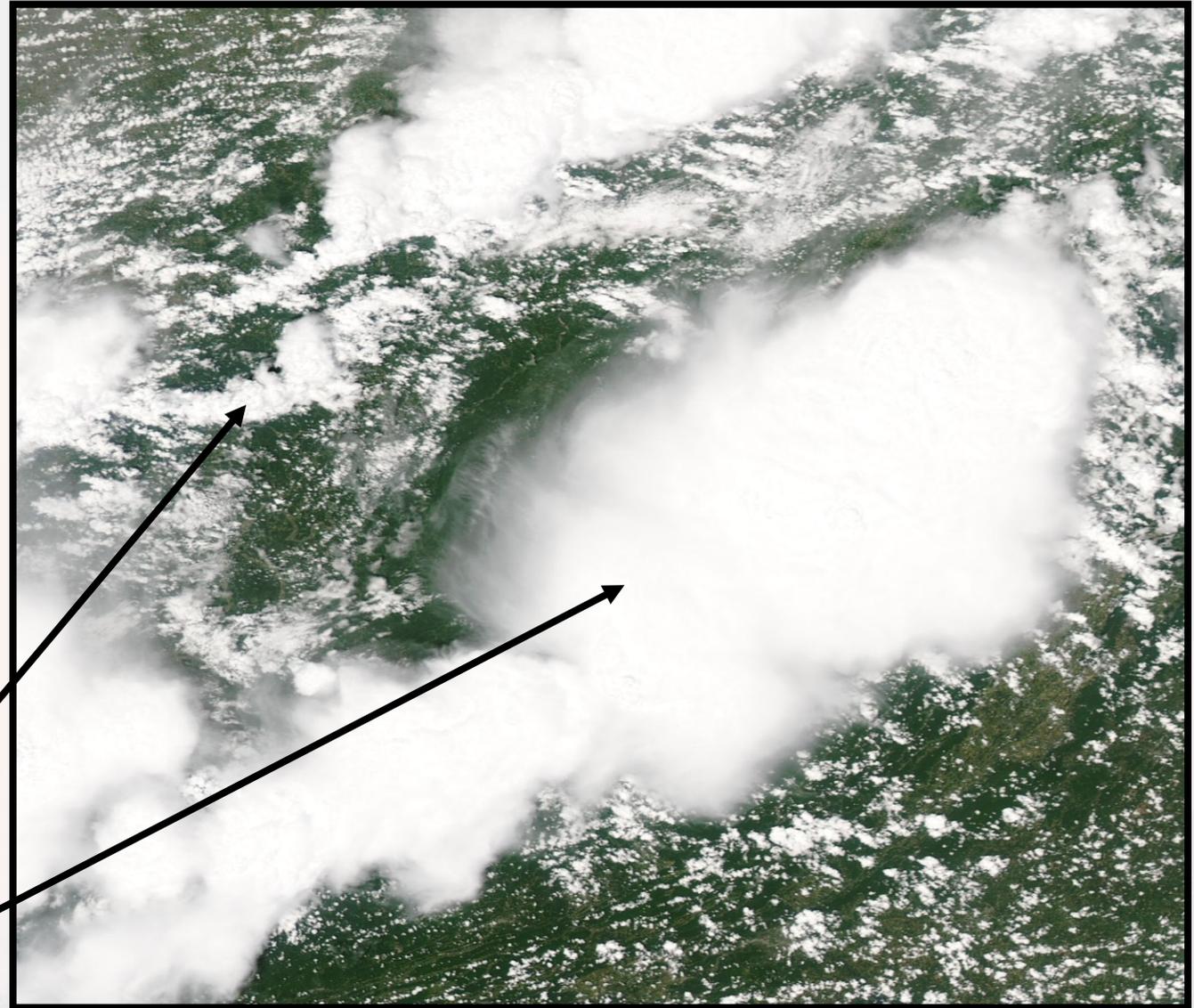
Above is a composite radar mosaic at 8:55 PM on June 14th showing a line of severe thunderstorms moving southeast through West Virginia. Below is a table showing the number of warnings issued before this active period versus during it.

Warnings Issued		
	Flash Flood Warnings	Severe Thunderstorm Warnings
January 1 – June 5	8	19
June 6-15	56	47

June 21st Heavy Rainfall, Flash Flooding, and Severe Weather

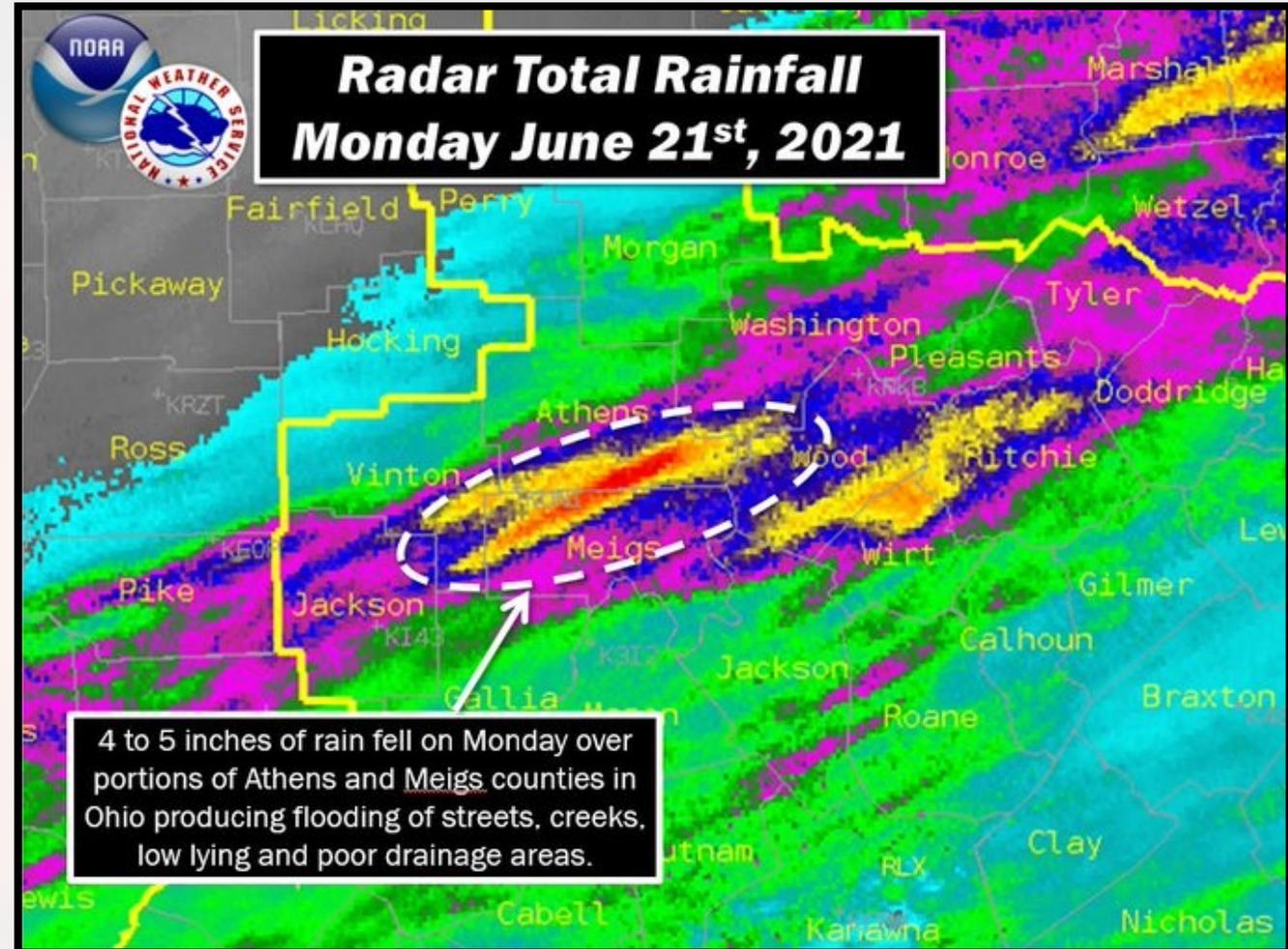
A cold front would approach the region from the west on June 21st, setting the stage for showers and thunderstorms to develop. Two waves of activity would affect the area, one being associated with a prefrontal trough, and the second with the cold front itself. Thunderstorms began developing shortly before noon across western portions of the area near Huntington (WV), with some storms being severe. These would continue eastward towards the mountains during the early afternoon hours, with several reports of tree damage along their path, as well as a report of roof damage at Industrial Park in Belington, WV (Barbour County).

Visible Satellite showing a second wave of thunderstorms forming during the early afternoon, along with the first wave of storms already further east.



June 21st Heavy Rainfall, Flash Flooding, and Severe Weather (Continued)

Another wave of more widespread showers and thunderstorms would develop mid to late afternoon as the cold front neared. Numerous severe thunderstorm warnings and several flash flood warnings were issued, with flooded roadways and more tree damage being reported. Rainfall totals of over 4" in a 3.5 hour period (4:00 – 7:30 PM) were reported near Albany in Athens County, Ohio due to training thunderstorms, with portions of Southeast Ohio and Northern West Virginia being hit particularly hard. The Shade River near Chester, Ohio crested at 20.7' (just below that of moderate flood stage), resulting in minor flooding on June 22nd and 23rd. The heaviest activity would move out of the area by 10 PM, with rainfall ending across the entirety of the area by noon on June 22nd as the cold front moved east of the region. In total, 20 Severe Thunderstorm Warnings were issued on June 21st, along with 3 Flash Flood Warnings.



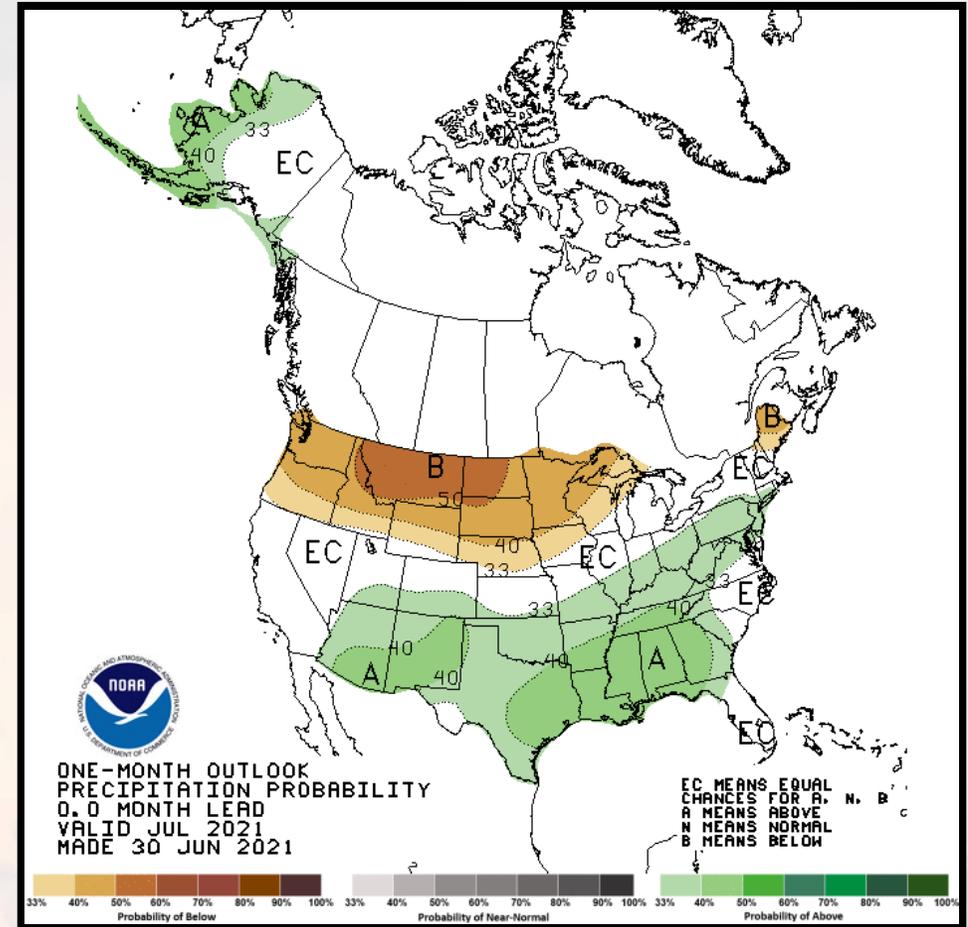
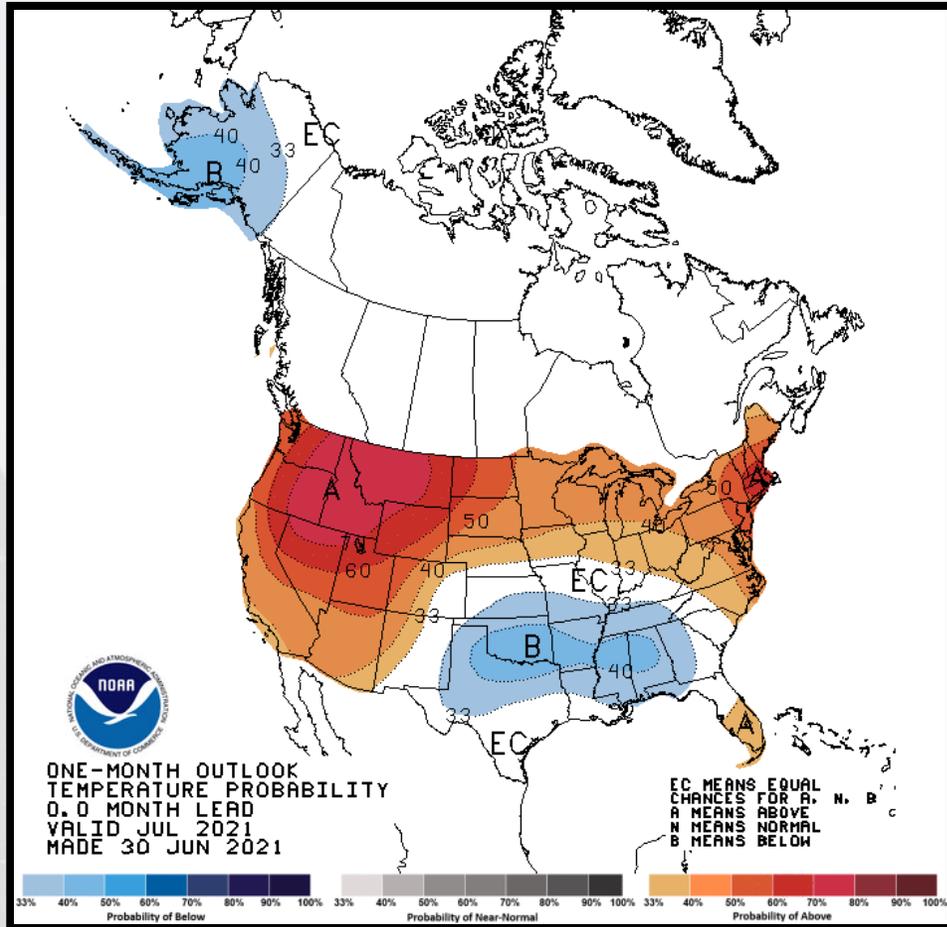
Rainfall totals for portions of Southeast Ohio and Northern West Virginia that were hardest hit by the June 21st event.

June 28-29th Heat Wave

The last week of June would be quite warm across the region due to southwest flow courtesy of high pressure located to the southeast. June 28-29th would be particularly warm however, as a mid-level ridge worked towards the region. This allowed the area to have its warmest weather of the year thus far, with many locations across the lower elevations having high temperatures in the low to mid 90s, with heat indices in the mid to upper 90s. Some locations saw heat indices of 100, even slightly above. Fortunately, an approaching cold front would provide the region with some much-needed relief from the heat starting June 30th, into the first part of July.

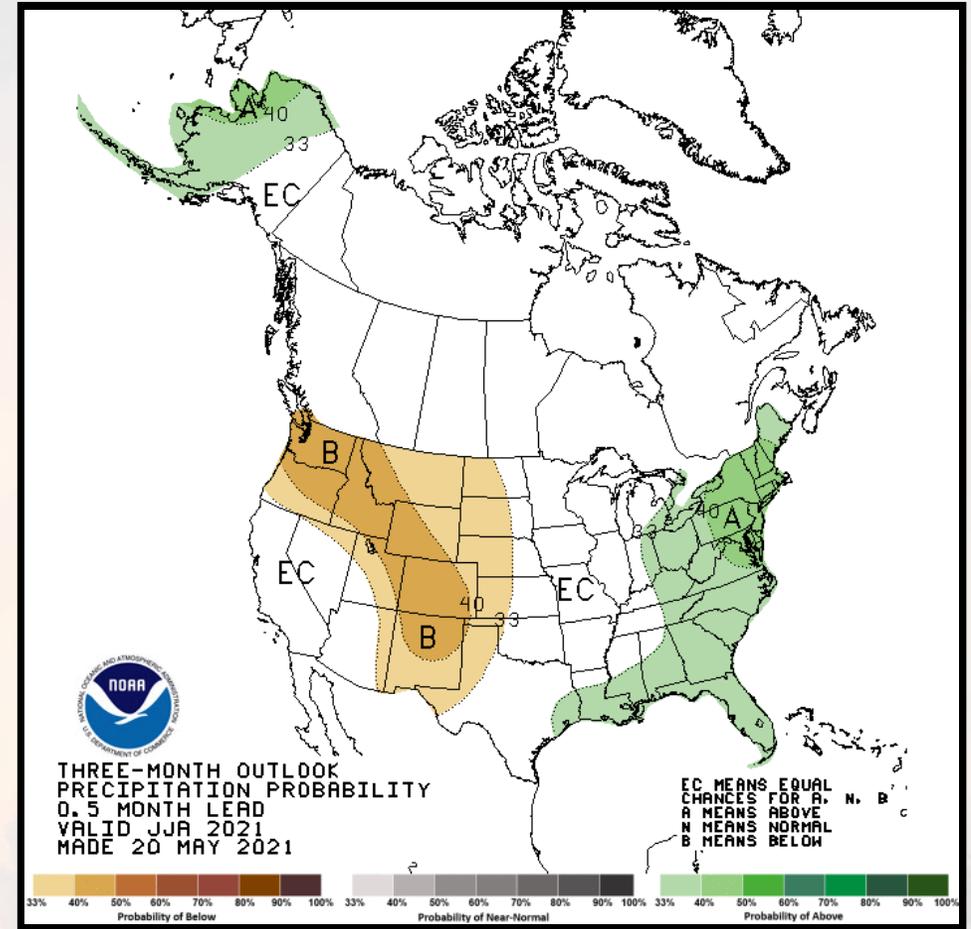
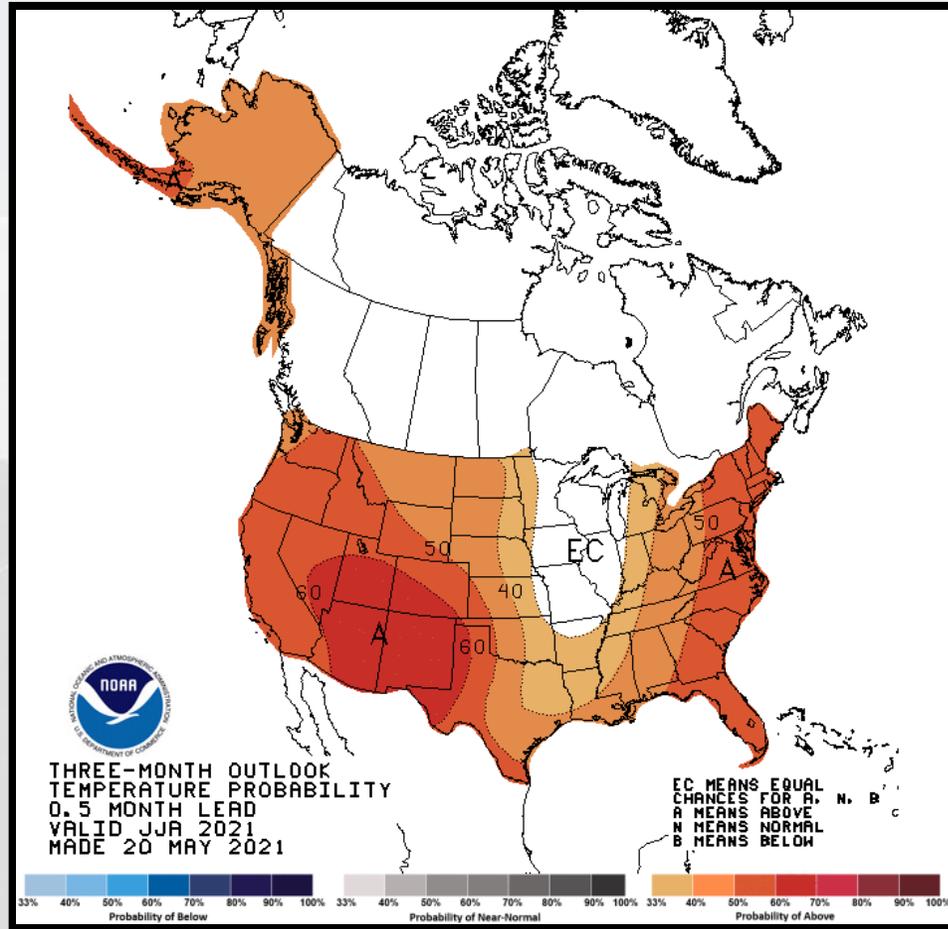
June 28-29th High Temperatures (F)		
Location	June 28th	June 29th
Beckley	87	85
Charleston	94	93
Clarksburg	91	92
Elkins	88	90
Huntington	94	93
Parkersburg	93	93

July Outlook



Climate Prediction Center One-Month Temperature and Precipitation Outlook for the United States.

Summer Outlook



Climate Prediction Center Three-Month Temperature and Precipitation Outlook for the United States: covering meteorological summer (June, July, and August).

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