

The Month in Review: July 2021

National Weather Service Charleston, WV



Photo courtesy of the National
Weather Service Charleston, WV

July 2021 Climate Summary

July was characterized by near to slightly below normal temperatures across the region, with departures generally ranging within a degree or so of normal. Precipitation totals varied significantly, with Northeast KY, far Southern OH, and extreme Western WV being above normal for July and receiving significantly more rainfall as compared to the rest of the region. While these areas were above normal for the month, much of the rest of the region was below normal for the month. One location that was particularly wet was Huntington, WV which received 9.50" of precipitation, enough to set a new mark for the wettest July on record!

July began on a chilly and unsettled note across the region with widespread showers and thunderstorms in advance of a slow moving cold front approaching the area. Following the passage of the front, drier weather would move into the area starting on July 2nd and continue through July 5th courtesy of high pressure. Heat and humidity would however begin to gradually build back into the region starting on July 4th, eventually leading to a few showers and thunderstorms moving back into the region by the evening of July 6th.

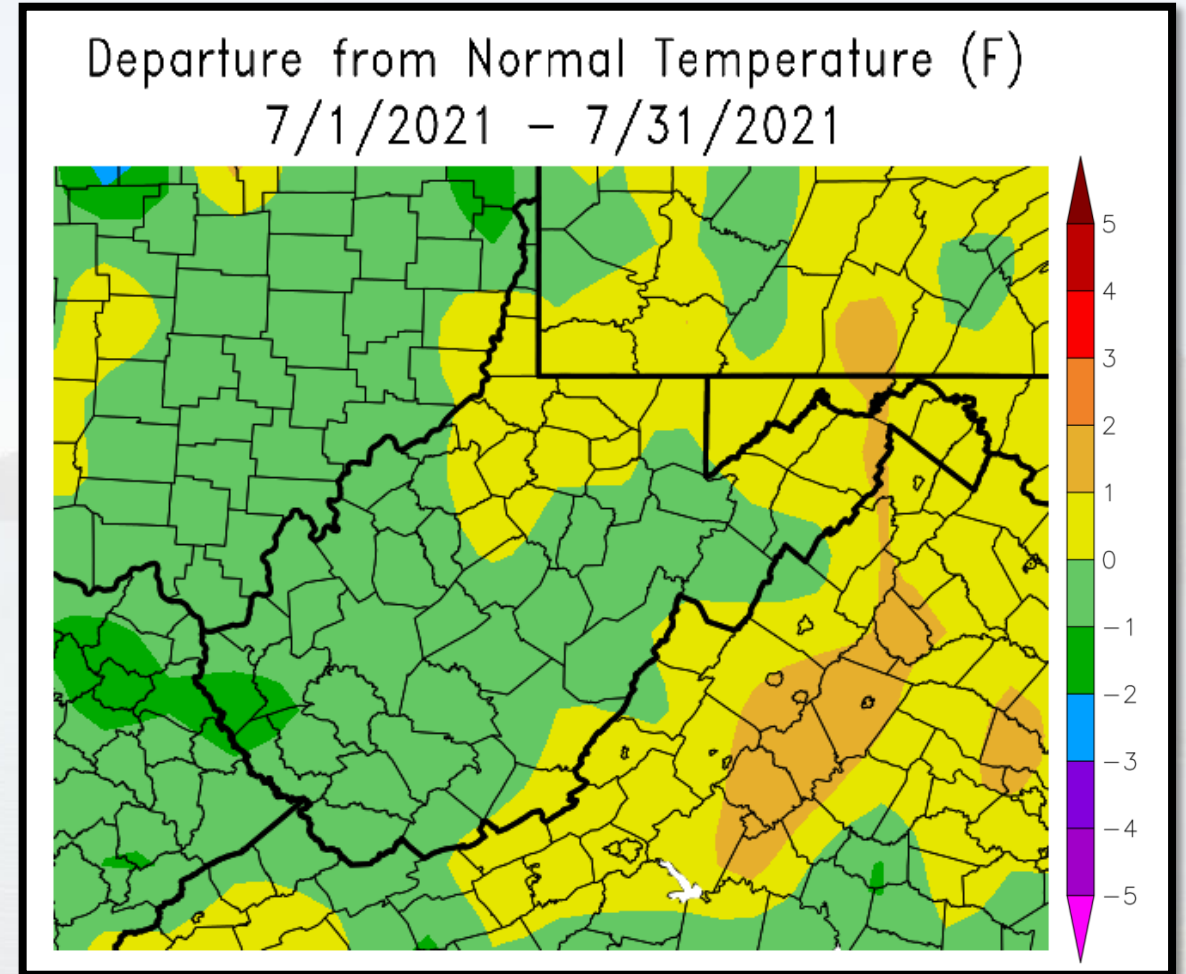
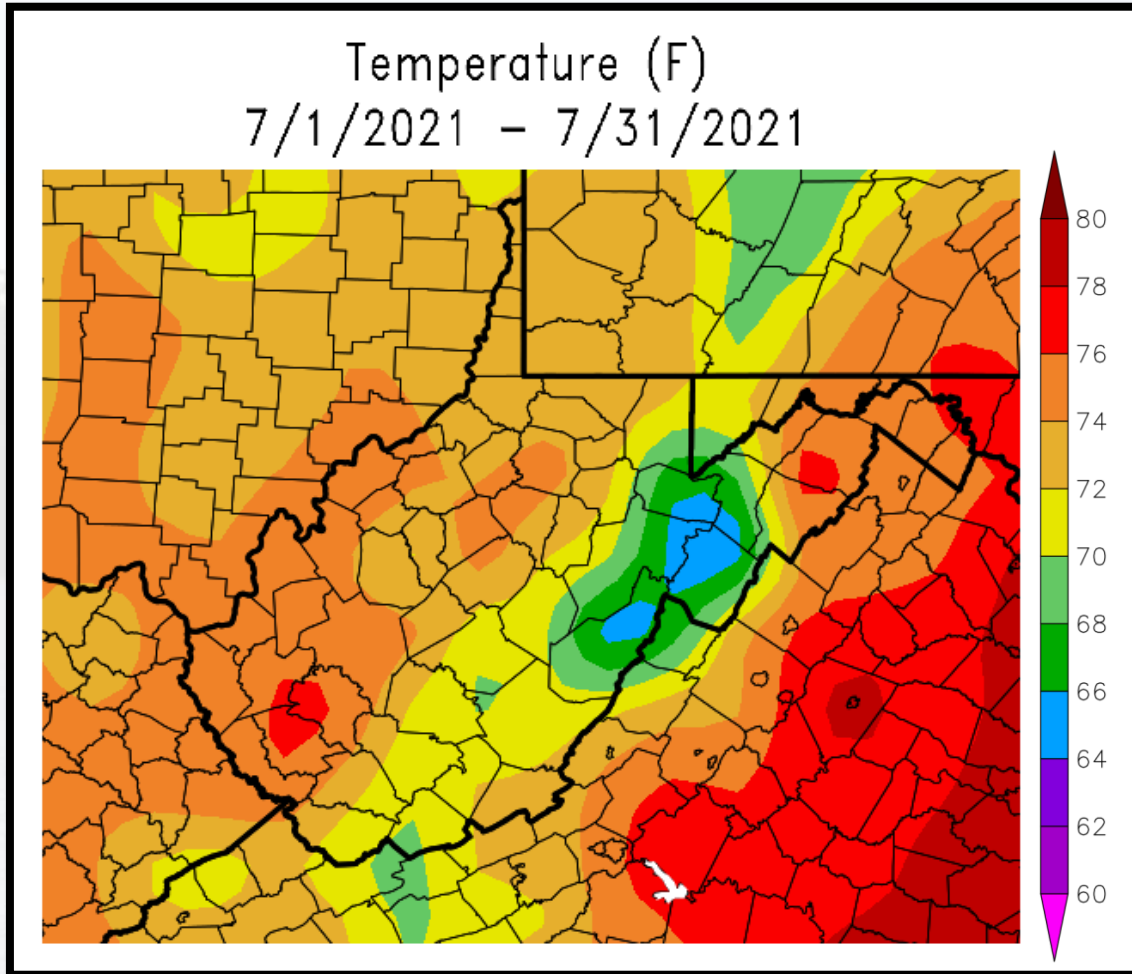
Showers and thunderstorms would become more widespread July 7-8th as a stationary front was positioned to the north of the region, with several reports of trees down across the area on July 7th. This front would then begin to slowly sink south towards the area as a cold front, moving through on July 9th, and briefly providing drier weather, before showers and thunderstorms moved back in during the afternoon of July 10th. With a favorable airmass in place, scattered showers and thunderstorms would at times affect the region over the course of the next week. Although severe weather was not widespread during this period, there were a few severe storms on July 10th and one on July 12th, as well as a couple reports of water issues during the evening of July 10th. A cold front would eventually move through the region on the evening of July 17th, ushering in an extended period of quiet weather through July 24th.

July 2021 Climate Summary (Continued)

Scattered showers and thunderstorms would affect portions of the region at times on July 25-26th ahead of an approaching cold front, but impacts were mainly limited to isolated heavy rainfall, with no severe weather reported. This would not be the case a few days later however when thunderstorms developed in the late afternoon and evening of July 29th as a cold front once again approached the area from the north. While the worst of the severe weather missed our region to the north, there was one severe thunderstorm that did produce a brief EF0 tornado in Washington County (OH) near Macksburg, the first tornado of the year in the NWS Charleston County Warning Area. Luckily there were no injuries, with damage confined to that of a few trees. No other reports of severe weather occurred on July 29th, with localized heavy rainfall being the main impact associated with other thunderstorms. The cold front would pass through the region on the morning of July 30th, with mainly quiet weather following in its wake to close out the end of the month.

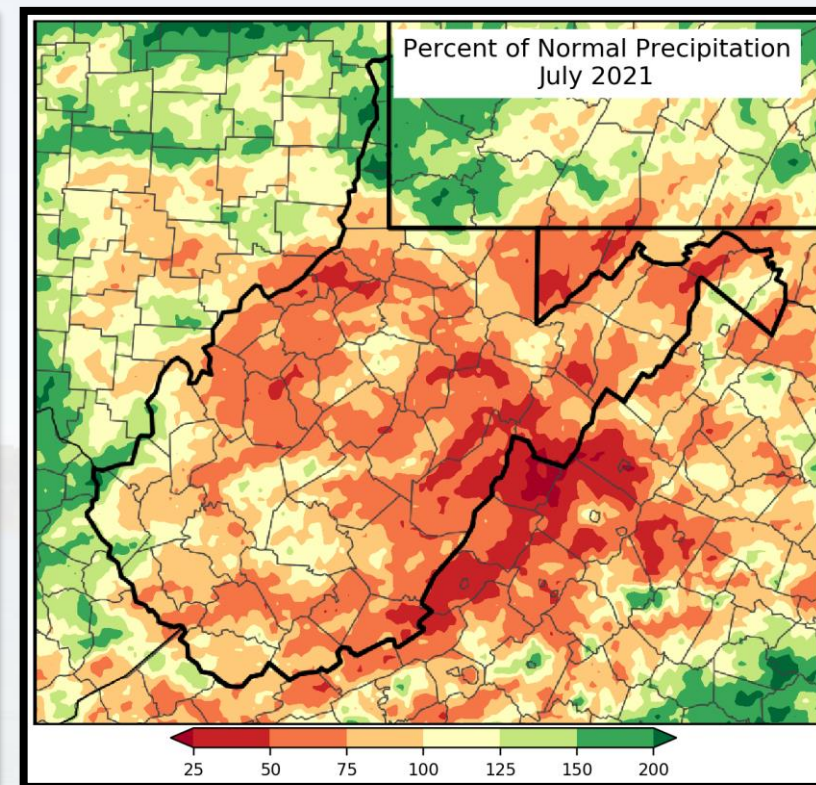
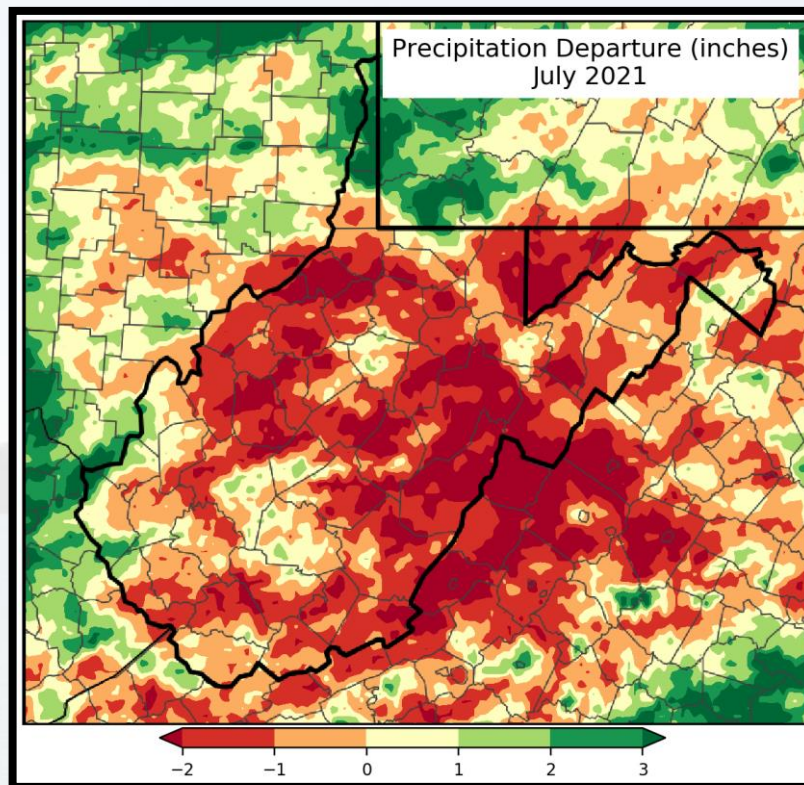
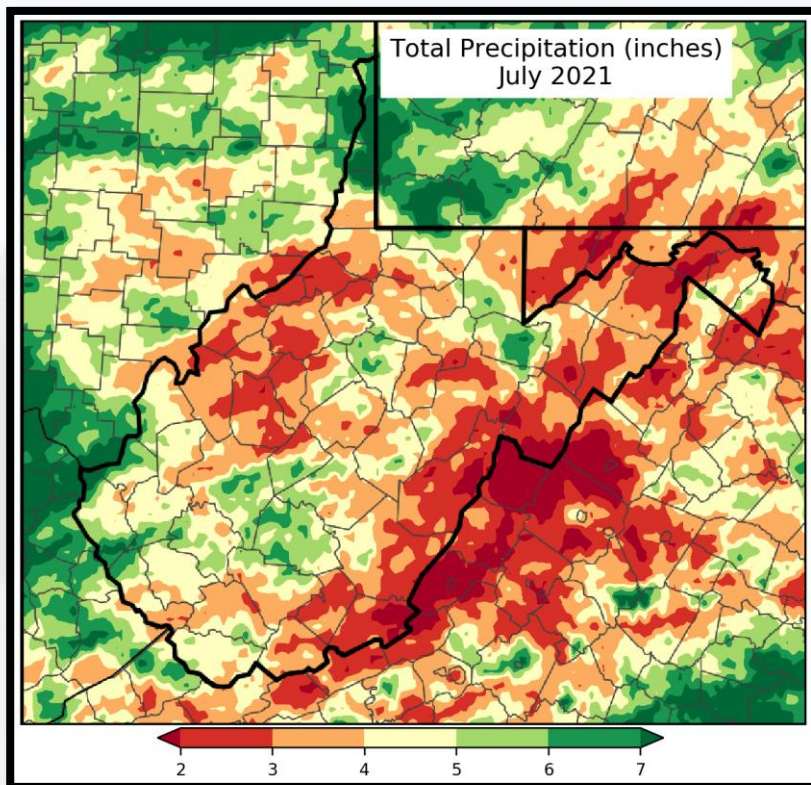
Event summaries for noteworthy events will be provided, along with temperature/precipitation departures for July. A record events list for the month of July, as well as temperature/precipitation outlooks are also included. In addition, temperature departures year to date will also be included in this edition.

July 2021 Average Temperature/Departure



Temperatures were near to slightly below normal areawide, generally ranging within a degree or so of normal. A small percentage of the area was slightly above normal, but the vast majority of the region was slightly below normal, with a small portion being 1-2 degrees below normal for the month. Average temperatures ranged from the mid 70s across the lowlands, to the mid 60s across the highest terrain in the mountains.

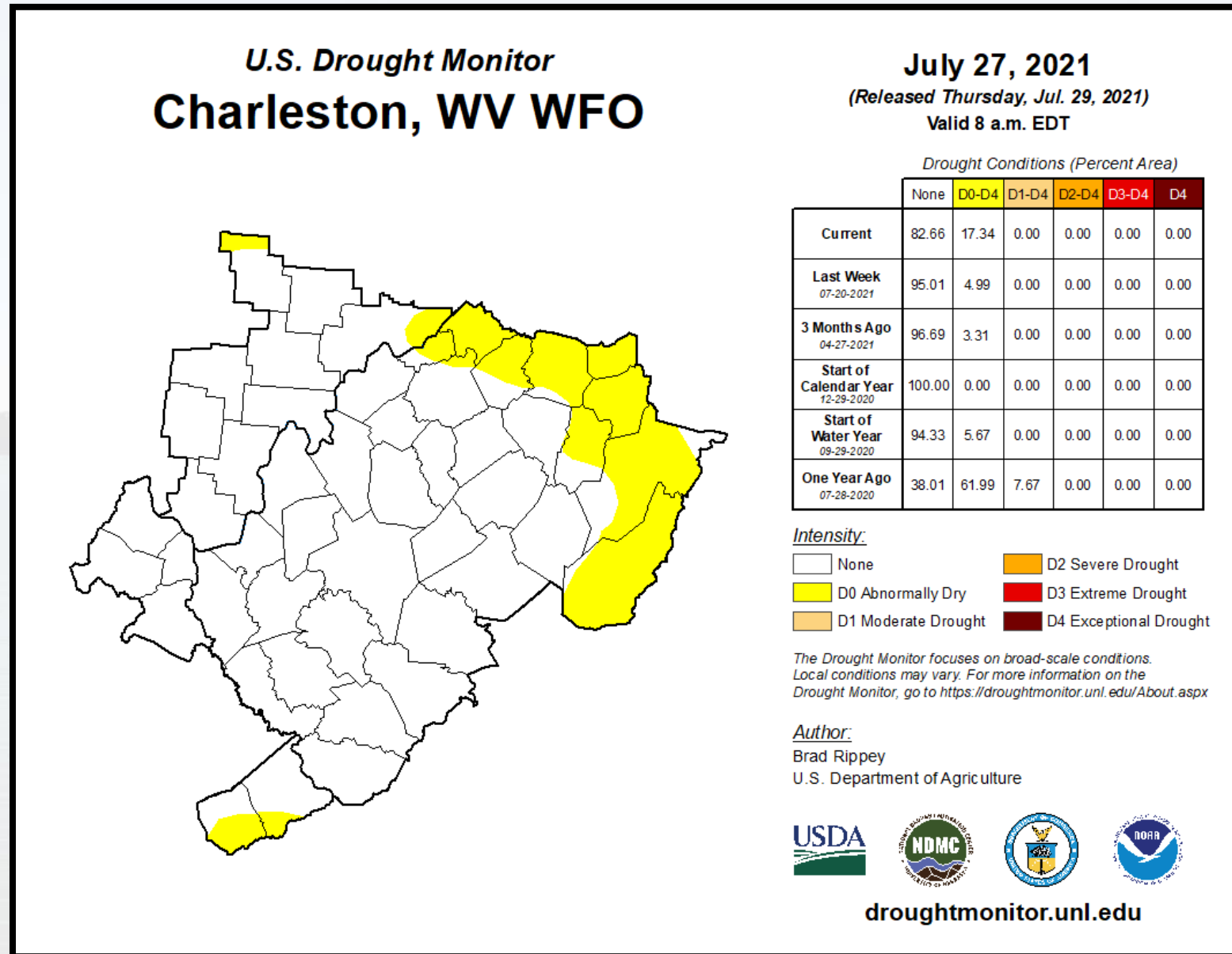
July 2021 Precipitation/Departure/Percent of Normal



July featured a significant spread in precipitation totals, with Northeast KY, far Southern OH, and extreme Western WV receiving significantly more compared to the rest of the region. These areas were above normal for precipitation for the month of July, while much of the rest of the region was below normal, with many areas only receiving 50-75% of normal precipitation for July, and some locations only 25-50%. As an example, let's compare two locations relatively close to each other, Huntington, WV and Parkersburg, WV. Parkersburg only had 2.49" for July, which was 1.96" below normal, while Huntington on the other hand had 9.50"! This was 4.42" above what is normal for Huntington, or approximately 187% of what is normal for July. As a result, Huntington ended up setting a new mark for the wettest July on record, breaking the old record by nearly an inch!

July 2021 Drought Monitor

Precipitation departures to varying degrees across most of the region in July lead to increasingly dry conditions throughout the latter two-thirds of the month. This resulted in a D0 (abnormally dry) area being present at the end of July, primarily across portions of Eastern/Northern WV, with a few smaller pockets located across portions of Southeast OH and Southwest VA. It encompassed approximately 17.3% of the area and would rapidly expand in size during the beginning of August.



July 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	81.2	0.5	61.5	-0.9	71.4	-0.2
Charleston	86.1	0.1	64.6	-0.9	75.4	-0.4
Clarksburg	83.9	-1.6	62.8	-1.4	73.3	-1.5
Elkins	82.5	-0.7	59.7	0.1	71.1	-0.3
Huntington	84.1	-2.3	65.9	-0.5	75.0	-1.4
Parkersburg	84.7	-0.6	63.5	-0.6	74.1	-0.6

Abbreviations: Avg, Average

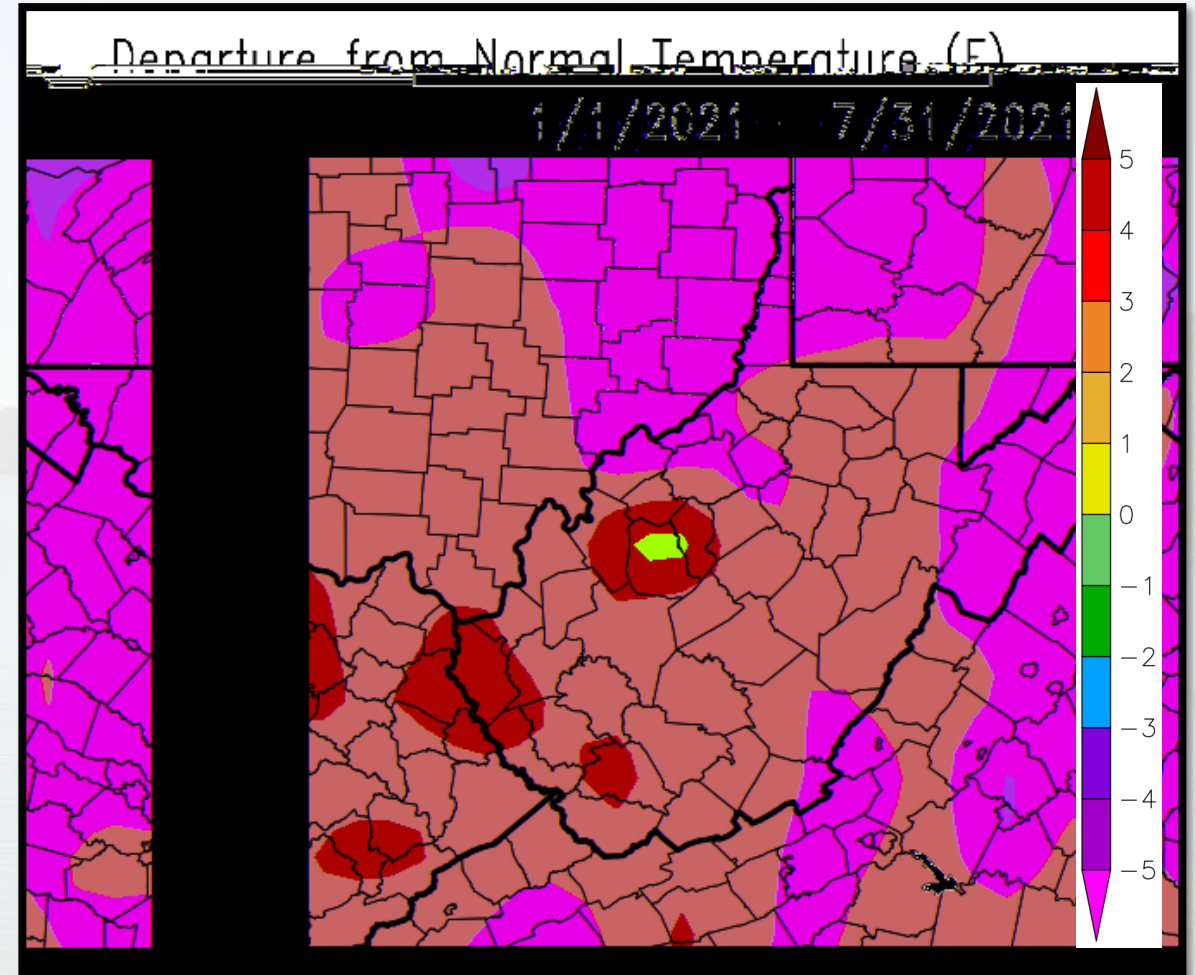
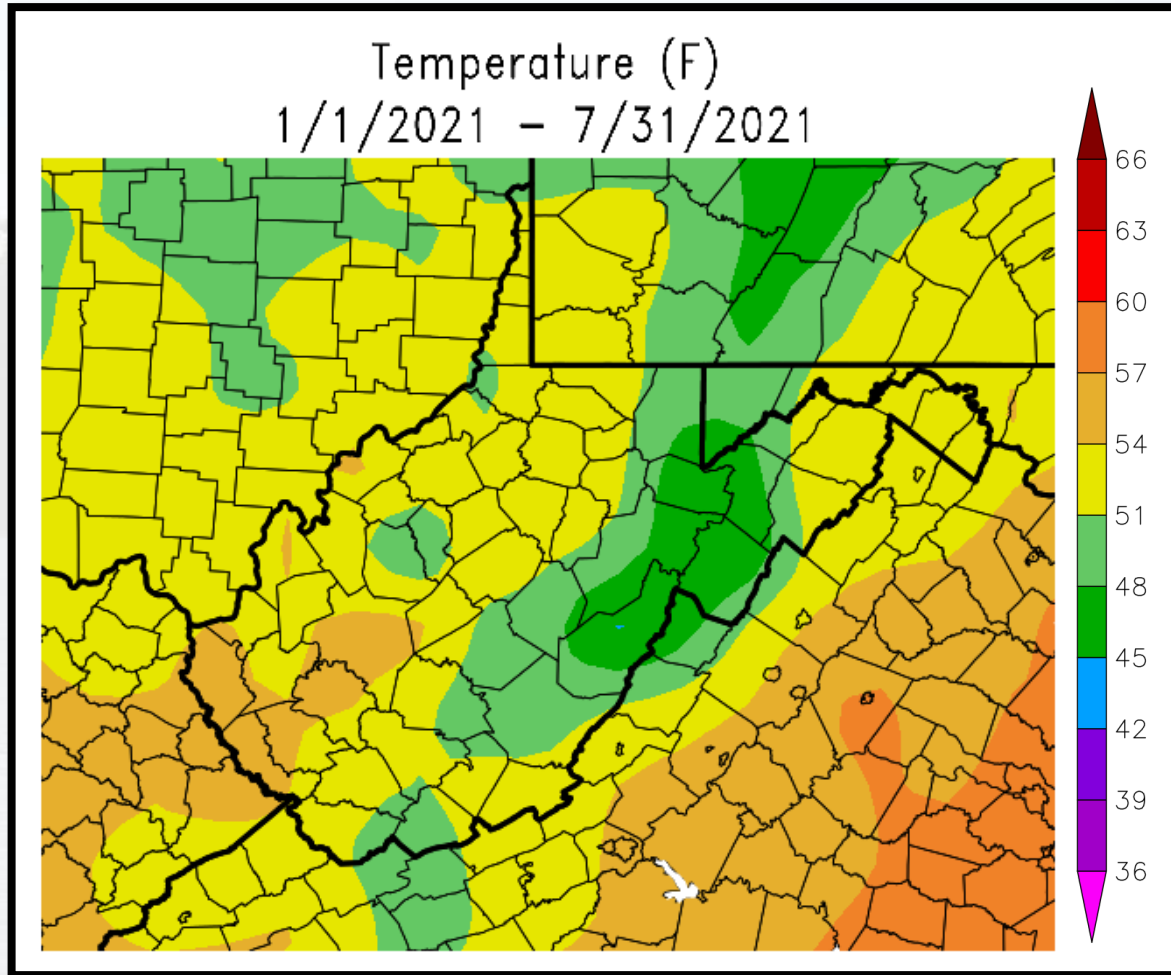
Notes: Temperatures/Departures are in degrees Fahrenheit

July 2021 Precipitation Statistics for Selected Cities

	Precipitation	Precipitation Departure	Precipitation Year to Date	Precipitation Year to Date Departure
Beckley	3.29	-1.71	25.43	-2.41
Charleston	3.11	-2.27	23.24	-6.12
Clarksburg	3.45	-1.95	22.20	-5.94
Elkins	3.39	-2.60	22.86	-7.45
Huntington	9.50	4.42	33.56	5.23
Parkersburg	2.49	-1.96	25.34	-1.39

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

Year to Date Average Temperature/Departure



Temperatures year to date through the end of July have generally been slightly below normal across the region, with most areas being within a degree of normal, with a few small pockets of slightly larger departures existing in spots.

Record Events for July

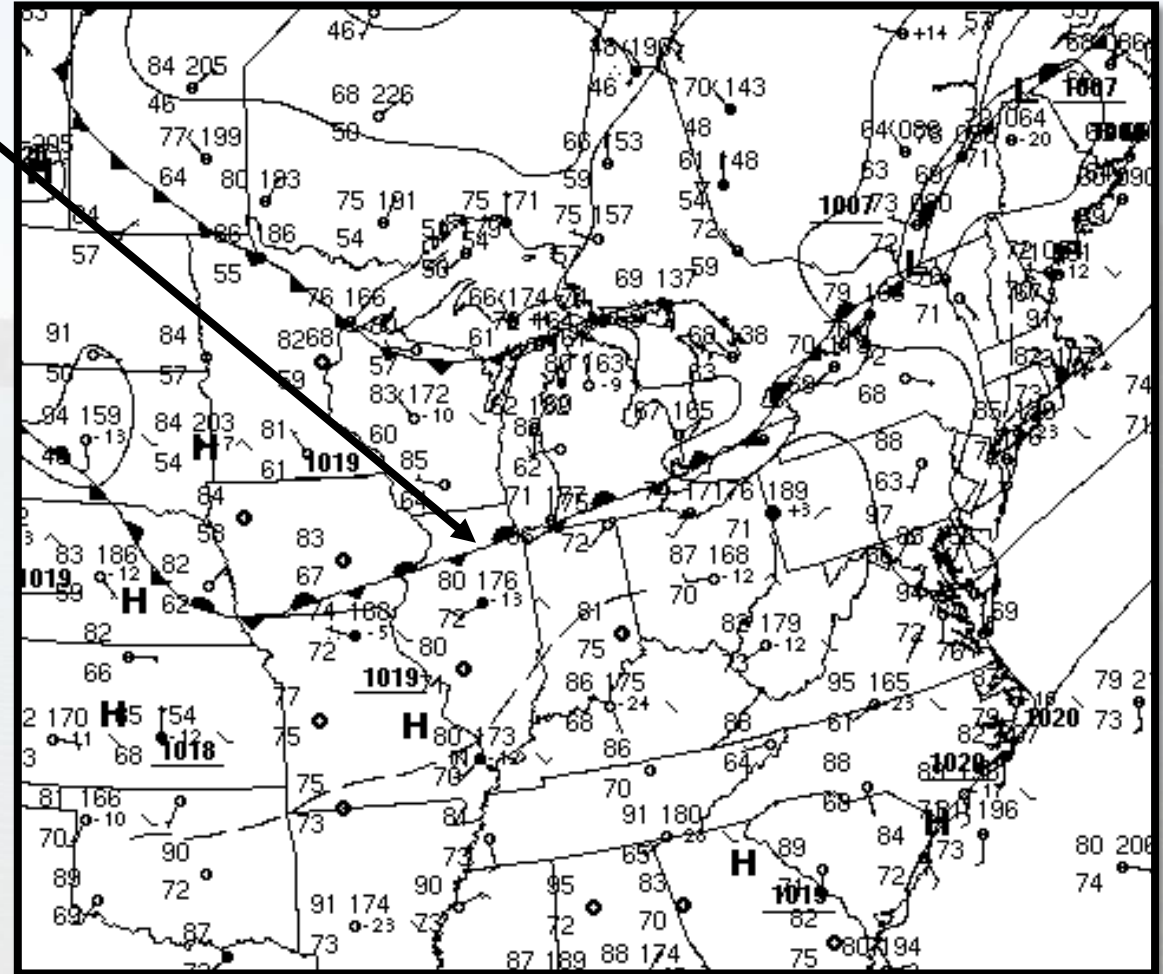
- July: Record maximum monthly rainfall for July set at Huntington, WV. A record rainfall of 9.50" was set at Huntington for the month of July, breaking the old record of 8.63" set in 1941.
- July 17th: Record daily maximum rainfall set at Huntington, WV. A record rainfall of 1.26" was set at Huntington, breaking the old record of 1.14" set in 1910.

July Noteworthy Events

- June 30th – July 2nd Heavy Rain, Flash Flooding, and Severe Weather
- July 7-9th Severe Weather and Isolated Flash Flooding
- July 10-17th Extended Unsettled Period (Severe Weather and Isolated Flash Flooding)
- July 29th Severe Weather

June 30th – July 2nd Heavy Rain, Flash Flooding, and Severe Weather

On June 30th, a stationary boundary was positioned across the Southern Great Lakes. This allowed scattered showers and thunderstorms to fire across portions of the area beginning in the late morning timeframe. Storms would continue to fire into the evening hours, bringing flooding to a few locations (such as Athens, OH and Danville, WV). In addition, there was also wind damage reported with some of these storms, with trees down in Athens, OH and Parkersburg, WV on the evening of June 30th. Rounds of scattered showers and thunderstorms with locally heavy rain would continue throughout the night resulting in more isolated flash flooding. Huntington, WV saw flooding overnight, with nearby Ashland, KY receiving 2.62" of rain from 12:00 AM to 2:40 AM on July 1st. In fact, 1.18" of that amount fell in a 5-minute period from 12:26 AM to 12:31 AM!

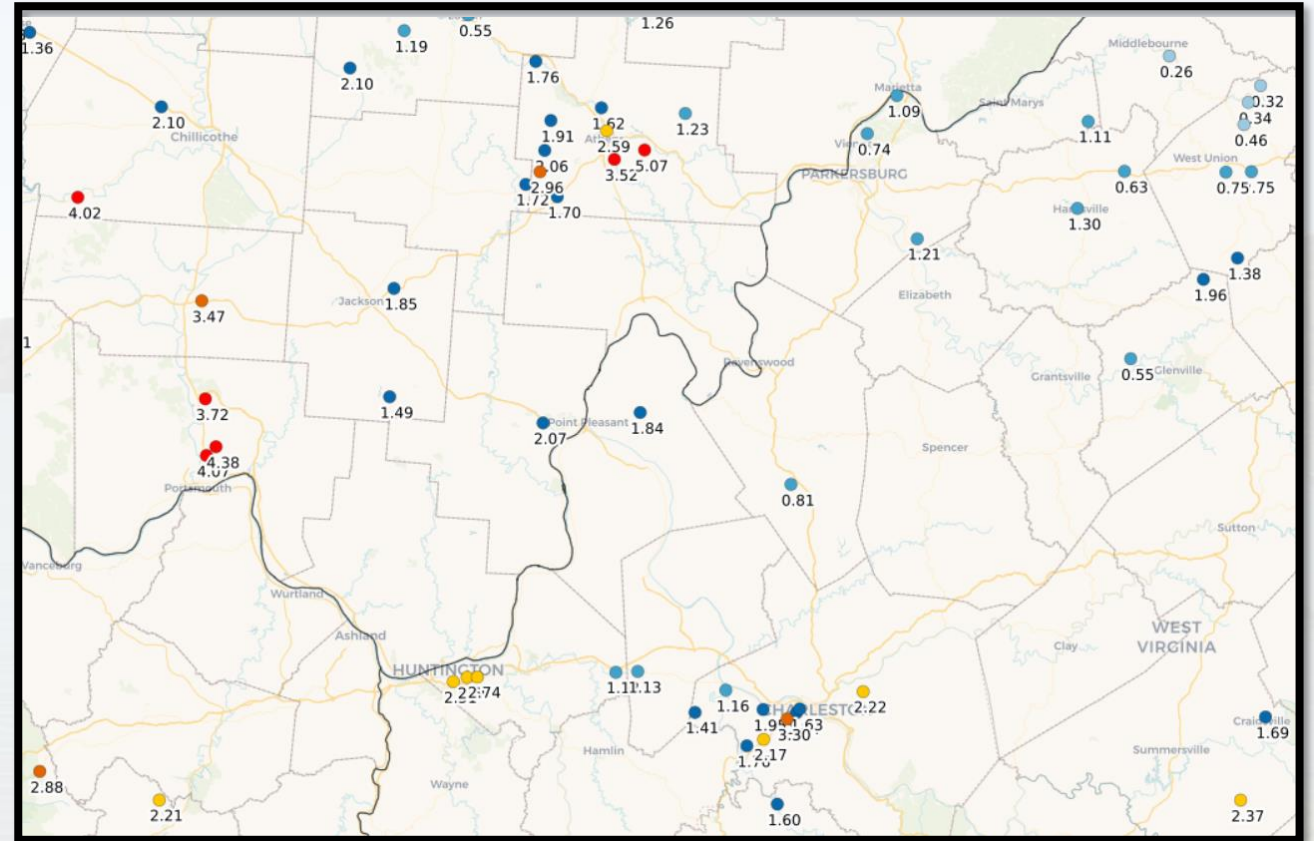


Surface analysis chart for June 30th at 5 PM showing a stationary front positioned across the Southern Great Lakes region.

June 30th – July 2nd Heavy Rain, Flash Flooding, and Severe Weather (Continued)

Widespread showers and thunderstorms would continue throughout the day on July 1st in advance of a slowly approaching cold front, with the entire region receiving rainfall. Generally overcast skies, along with steady rain, kept high temperatures only reaching the mid to upper 70s, which is on the chilly side for early July. Showers and storms would gradually taper from north to south during the late evening, with rain having exited the region entirely by shortly after sunup on July 2nd as the cold front finally pushed through. Following the passage of the cold front, temperatures were unseasonably cool, with highs in the low to mid 70s across the region.

In total for this event, six flash flood warnings were issued, along with two severe thunderstorm warnings. There were numerous rainfall reports of 1-3"+ across portions of the area (for the 48-hour period ending on the morning of July 2nd), with up to 5.07" reported approximately five miles ESE of Athens, OH. See the above image for other 48-hour rainfall totals (ending on the morning of July 2nd) from the hardest hit areas for this event.



July 7-9th Severe Weather and Isolated Flash Flooding

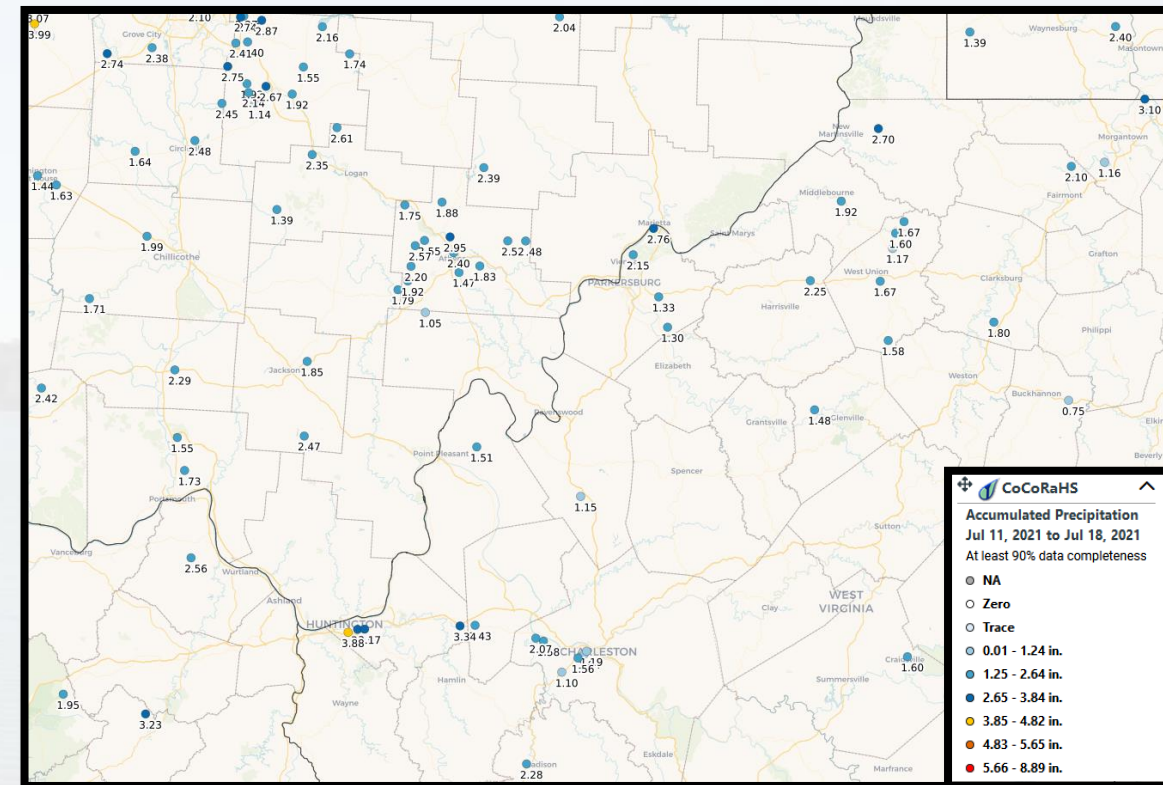
The region saw multiple rounds of showers and thunderstorms from July 7th to July 9th that produced some isolated flash flooding and damaging winds. The set up for this event was similar to the event that occurred at the start of the month. A stationary boundary located across the Southern Great Lakes on July 7th would slowly move southeast as a cold front, eventually moving through the area on July 9th, with scattered showers and thunderstorms occurring at times across the area out ahead of it.

During this three day stretch, July 7th was the most active day. Thunderstorm activity started in the early afternoon, increasing in coverage as the day went on. Some slow-moving thunderstorms did prompt two flash flood warnings for Randolph and Fayette counties, with minor water issues being reported. Two severe thunderstorm warnings were also issued, with reports of trees downed in Calhoun, Gilmer, Harrison, and Lewis counties. Thunderstorms would dissipate after sunset leaving only scattered showers across the area during the overnight hours.

Thunderstorm activity on July 8th was not as widespread as the previous day. The area saw scattered showers for most of the day until isolated thunderstorms formed mainly in the northern counties. Tropical Storm Elsa would enhance some thunderstorm activity in Randolph and Pocahontas counties as it turned up the east coast. Scattered showers and thunderstorms would continue to affect the region at times through the morning of July 9th, with all activity on both July 8th and July 9th being of the non-severe variety. Drier weather would then move back in by late morning on July 9th as the cold front pushed through the region. Highly localized rainfall amounts in excess of 2" were reported for this three-day timeframe, with 2.21" being reported in northwest Meigs County (OH).

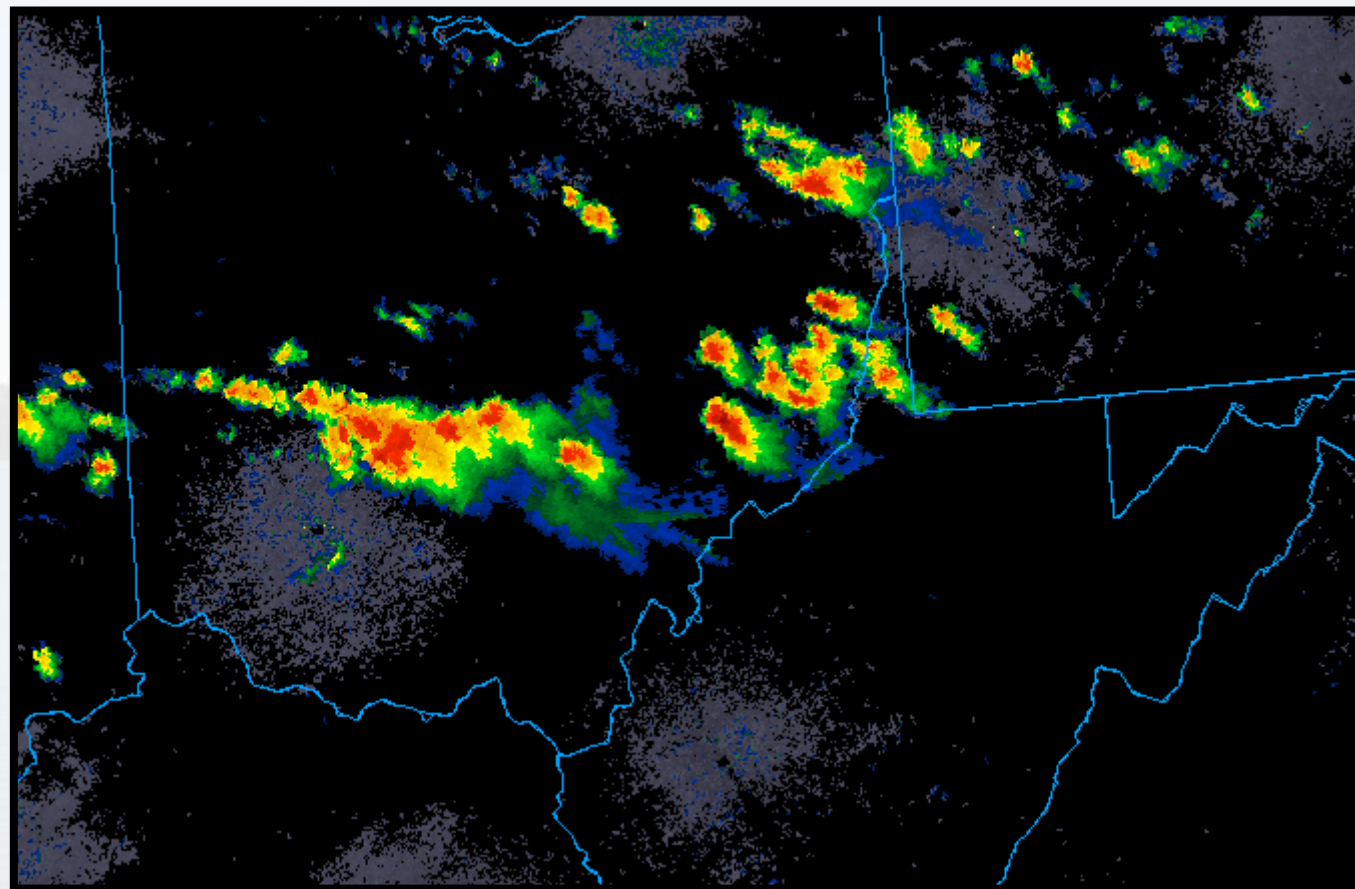
July 10-17th Extended Unsettled Period (Severe Weather and Isolated Flash Flooding)

July 10th through July 17th was an overall active timeframe for showers and thunderstorms. While the period was active given the airmass in place, there were no big severe weather outbreaks, but rather daily chances for showers and storms, with a few storms becoming severe at times. The most active day from this period in terms of severe weather was July 10th, with three severe thunderstorm warnings and one flash flood warning being issued. Trees were reported down in Mingo County (WV), as well as in Buchanan County (VA). Flash flooding was also reported in Buchanan County, with over 3" of rain in spots. One more severe thunderstorm would affect portions of the area on the evening of July 12th with reports of a couple of trees down in Mason County (WV) near Mercers Bottom and Point Pleasant. After July 12th, no severe weather was reported during the rest of the period, with mainly scattered showers and thunderstorms at times for portions of the area, with heavy downpours being the main issue. A cold front would move through the region during the evening of July 17th, putting an end to the wet weather, and ushering in much drier conditions into the region for several days ahead. Rainfall totals of 1-2" were common from this 8-day stretch, with some isolated locations seeing 2-4" of rain. Rainfall totals from CoCoRaHS observers in some of the hardest hit areas over the 8-day stretch can be seen in the image above.



July 29th Severe Weather

On July 29th a surface cold front would approach the region from the northwest, providing a focusing mechanism for thunderstorm development across the area amid favorable environmental parameters for severe weather. During the late morning and early afternoon, a decaying mesoscale convective system (MCS) moved through portions of Southeast Ohio and Northern West Virginia with no severe weather reported. More robust thunderstorms would begin to quickly develop a few hours later as the cold front approached, given ample instability across the region. Storms would begin to enter portions of Southeast Ohio around 4 PM as they moved southeastward. Most of the severe thunderstorms stayed to the north and west of our area, but one severe storm did affect portions of Southeast Ohio at approximately 5 PM.



Above is a composite radar mosaic at 4:55 PM on June 29th showing thunderstorms moving southeastward into Southeast Ohio and Northern West Virginia. This is approximately 20 minutes before the tornado near Macksburg, Ohio touched down.

July 29th Severe Weather (Continued)

Given a favorable environment, including adequate low level storm relative helicity values, a brief EF0 tornado was produced by a thunderstorm in Washington County (OH), touching down one mile south of Macksburg near I-77. The path length of the tornado was approximately 150 yards, with peak estimated winds at 75 mph. Luckily there were no injuries reported, with the only damage observed being to several trees. This was the only report of severe weather on the evening across the area, with more significant severe weather staying just to the north of the area, including several more tornadoes. Thunderstorms would continue to progress southeastward through the area during the evening, with the main impact being locally heavy rainfall, with most activity having exited the region by the early morning hours of July 30th. Portions of Northeast Kentucky were hit the hardest with heavy rainfall, with multiple reports in the 1-2" range. A few isolated areas received in excess of 2", but no reports of any water issues were received.

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Public Information Statement
National Weather Service Charleston WV
533 PM EDT Fri Jul 30 2021

...Brief EF0 Tornado Confirmed Near Macksburg in Washington County
Ohio on July 29, 2021...

Location: 1 mile south of Macksburg in Washington County Ohio
Rating: EF0
Estimated Peak Wind: 75 mph
Path Length: Approximately 150 yards
Maximum Path Width: Approximately 55 yards
Fatalities: 0
Injuries: 0

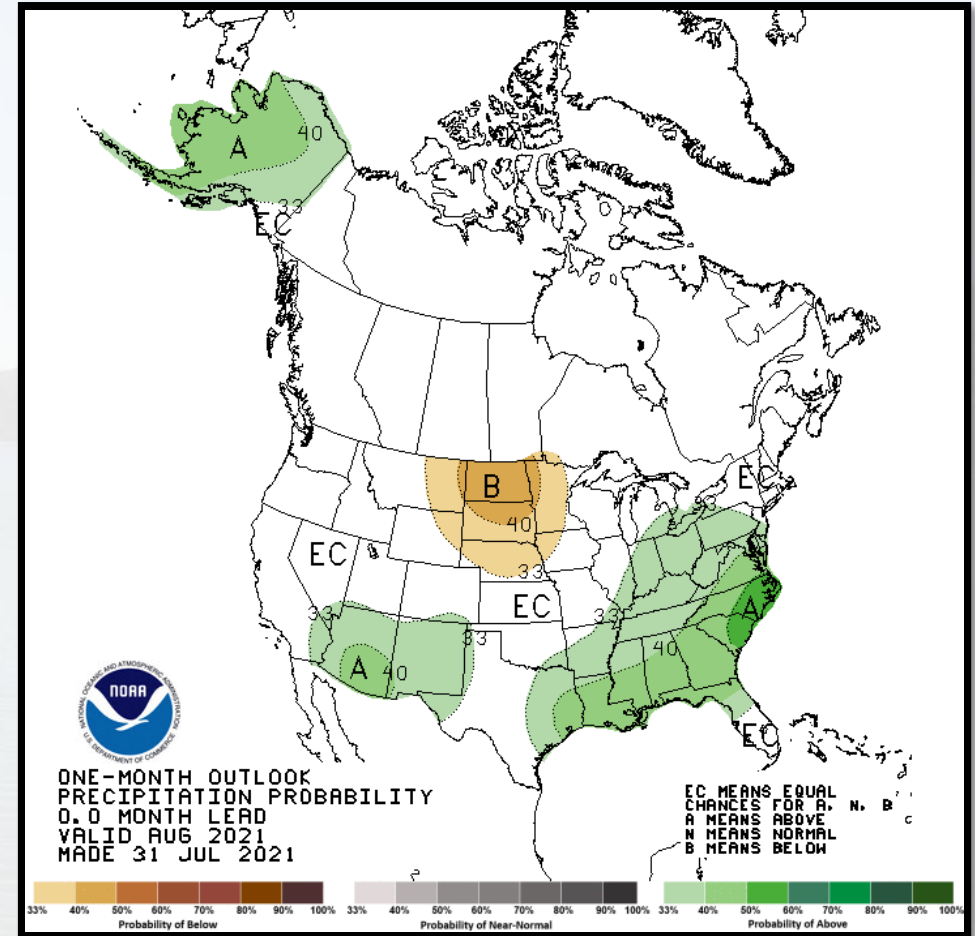
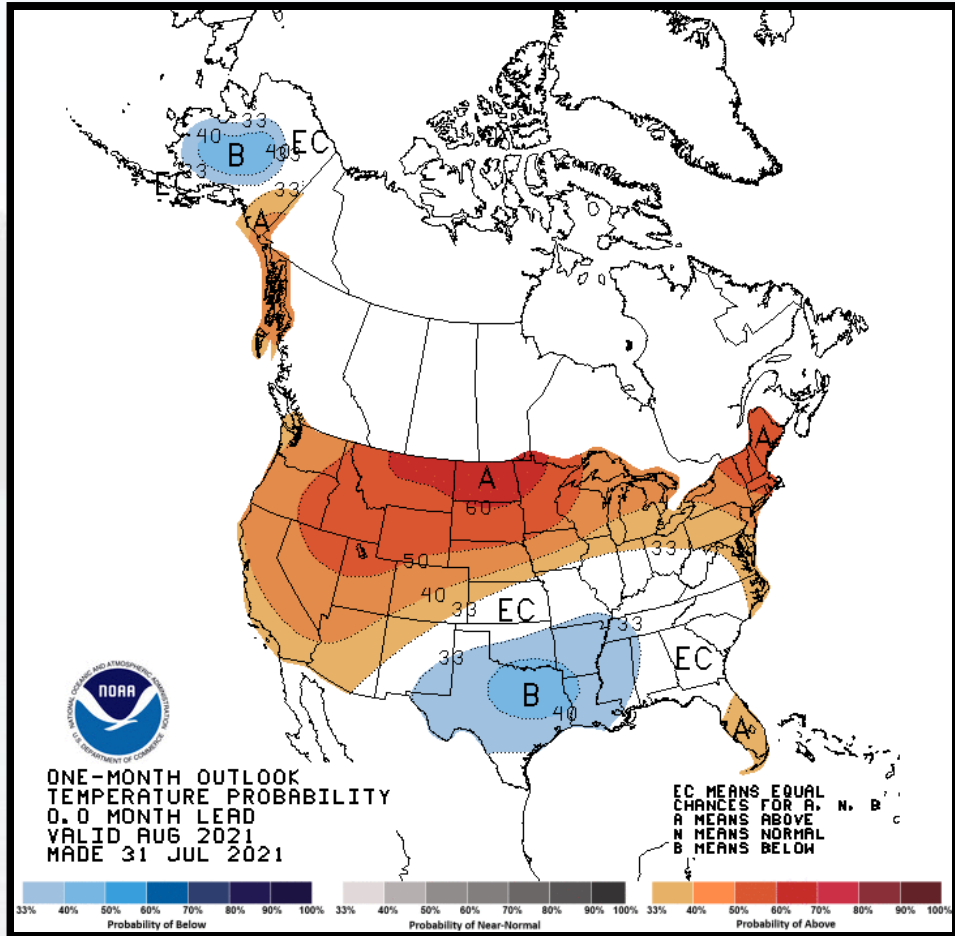
Date: 7/29/2021
Estimated Start Time: 5:16 PM EDT
Estimated End Time: 5:17 PM EDT
Beginning Lat/Lon: 39.6187 / -81.4614
Ending Lat/Lon: 39.6177 / -81.4610

Survey Summary:

The National Weather Service in Charleston, WV confirmed a brief
tornado just south of Macksburg by video evidence and an on-site
survey. The damage was confined to the the intersection of
Highland Ridge Road and Cats Creek Road, adjacent to Interstate
77 Southbound. The tornado caused damage to a few hardwood and
softwood trees. The damage consisted of some downed large softwood
limbs along with a pine tree that was uprooted next to a mobile
home. No structural damage was observed.
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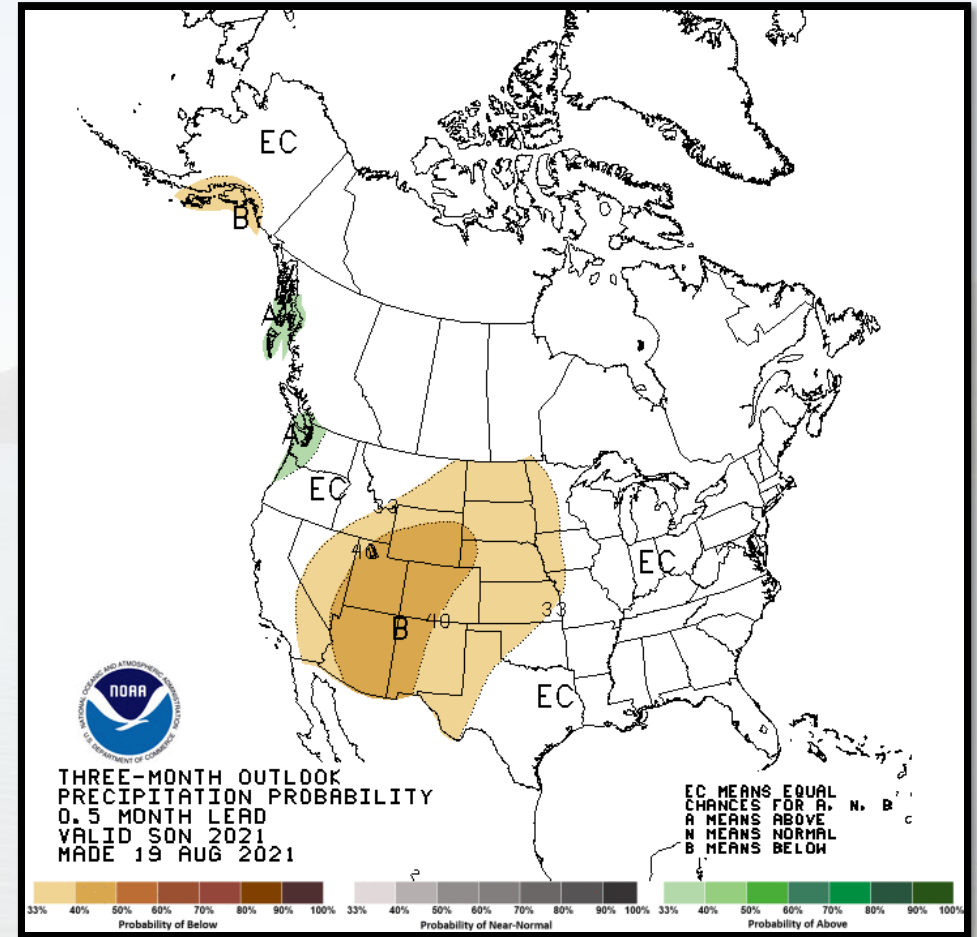
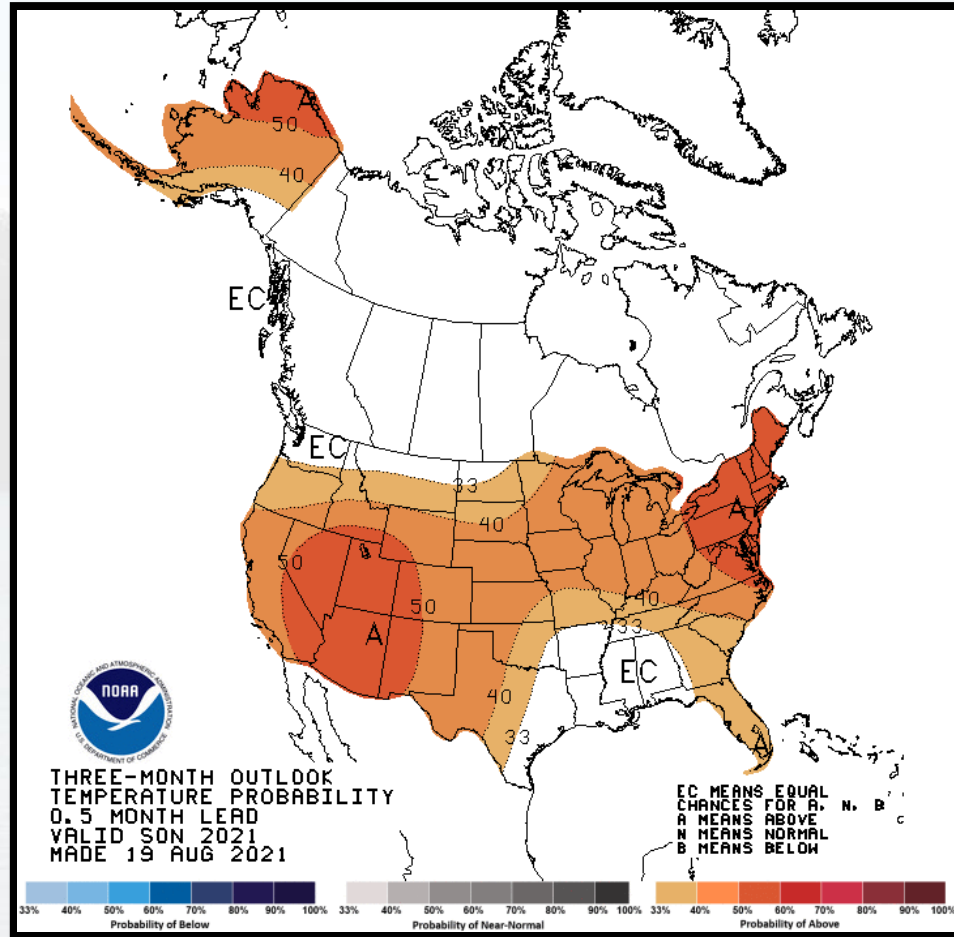
The Macksburg tornado was the first tornado of the year in the NWS Charleston forecast area. The Public Information Statement released on it can be seen above.

August Outlook



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

Fall Outlook



Climate Prediction Center Three-Month Temperature and Precipitation Outlook for the United States: covering meteorological fall (September, October, and November).

We are looking for volunteer observers!

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always looking for new
volunteers across our area. If
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to the right. More information
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The **Community Collaborative Rain, Hail and Snow Network (CoCoRaHS)** needs you! Everyone can participate, both young, old, and in-between. The only requirements are an enthusiasm for watching and reporting weather conditions and a desire to learn more about how weather can affect and impact our lives.



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