

A photograph of a dirt path winding through a forest. The path is light-colored and curves to the right. The foreground is dominated by tall, green grasses. The background shows a dense forest of trees with some autumn-colored foliage. The sky is a pale, hazy blue.

The Month in Review: August 2021

National Weather Service

Charleston, WV

**Photo courtesy of the National
Weather Service Charleston, WV**

August 2021 Climate Summary

August was characterized by above normal temperatures across the region, with departures generally ranging from 1-4 degrees above normal. Precipitation totals varied, with both above and below normal totals being observed, thanks in part due to the remnants of multiple tropical systems affecting the region. Portions of Central and Western WV, Southwest VA, and sections of Southeast OH received significantly more precipitation compared to parts of the rest of the region, with nearly 12" being observed in some locations for the month. This variation in precipitation totals led to sizeable areas being well above normal (> 200%) for the month, while some locations further east in the mountains only received 50-75% of normal precipitation. As mentioned earlier, the remnants of two tropical systems affected the region, those being the remnants of former Tropical Storm Fred and the remnants of former Hurricane Ida.

August began on a relatively quiet note with scattered showers and isolated thunderstorms across portions of the area on August 1st associated with a weak cold front. After a brief break, diurnal showers and thunderstorms would move back into the area on August 3rd as an upper trough would settle over the region. There were a few reports of trees and power lines down in Roane, Putnam, and Jackson Counties (WV), with two severe thunderstorm warnings issued that evening. In addition, some flooding was also reported in Putnam County near Teays Valley, with 2.75" reported near Eleanor.

August 2021 Climate Summary (Continued)

Daily showers and thunderstorms, mainly of the isolated to scattered diurnal variety, would then continue through mid-month across the region, with upper disturbances at times enhancing activity. While most of the activity during this timeframe was of the non-severe variety, there were some reports of flooding and severe storms. On August 4th diurnal, stagnant, pulse showers and thunderstorms would produce locally heavy rainfall that would result in two flash flood warnings being issued. Water was reported in residences in Shinnston, WV (Harrison County), with small hail and downed trees also reported in other parts of Harrison County. One particularly impressive rainfall report was from near Odd, WV (Raleigh County), where 5.00" of rain was reported in two hours from 9 to 11 PM!

Daily showers and thunderstorms would start to become slightly more widespread and significant starting on August 9th. Downed trees were reported on both August 9th (Kanawha County) and August 10th (Lawrence and Tyler Counties). Flash flooding would instead be the issue on August 11th, with two flash flood warnings issued, and up to 2.48" of rain reported near Madison, WV in Boone County. A mudslide was even reported in Raleigh County near Whitesville. August 13th would be the most active day of the first half of August with seven severe thunderstorm warnings being issued, as well as one flash flood warning, as thunderstorms blossomed ahead of a slowly approaching cold front. West Central WV and Southeast OH were hit particularly hard. There were numerous reports of downed trees, along with some reports of downed power lines, with wind gusts of 60-80 mph reported. In addition, impassable roads were reported due to flash flooding, with water in some basements. Up to 2.52" of rain was reported near Culloden, WV (Cabell County), and by mid-month, several locations west and southwest of Charleston had already received 4-5"+ of precipitation for August.

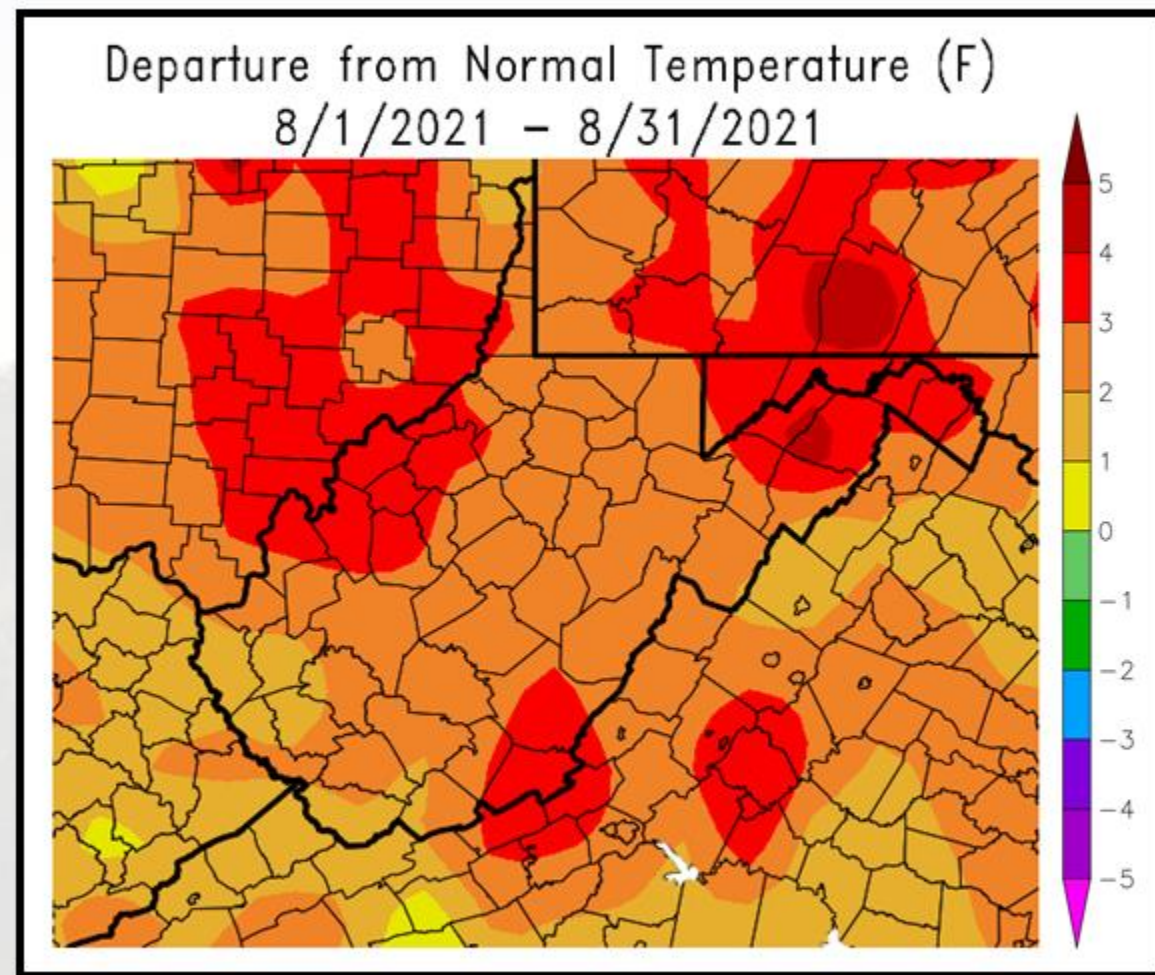
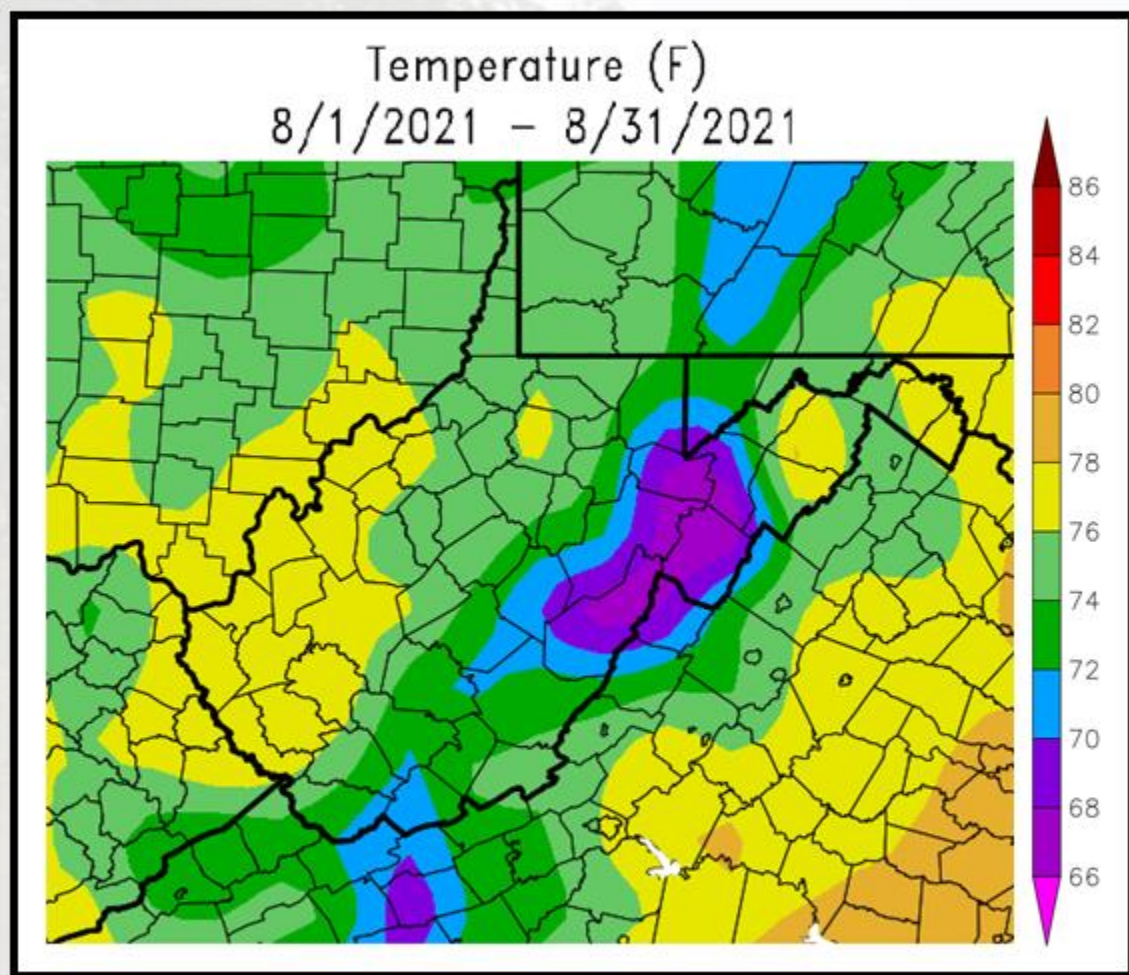
August 2021 Climate Summary (Continued)

Tropical storm Fred would make landfall in Florida on August 16th and then head northward towards the area. Rain in advance of, in association with, and following the remnants of Fred, would lead to multiple flash flood warnings and water issues in the August 15-19th timeframe across the region. Following this, daily isolated/scattered diurnal showers and storms would continue across the region through much of the remainder of August, but in general, quieter weather would spread over the region. There were some reports of downed trees, as well as of isolated flash flooding on August 25th. One particularly impressive rainfall report was of 1.52" in 43 minutes at Beckley, WV (Raleigh County) on the evening of August 25th, with a daily total of 1.77", enough for a new record for the date!

The month would close with a slowly approaching cold front, along with the impending remnants of Hurricane Ida, leading to increasing rainfall across the area from August 30th through September 1st. Scattered thunderstorms out ahead of the cold front would yield isolated reports of downed trees on August 29th. Showers and thunderstorms would then become more widespread starting on August 30th, with locally heavy rainfall occurring in spots, leading to flash flooding and extensive damage across portions of the region, with Hurley, VA experiencing significant flash flooding.

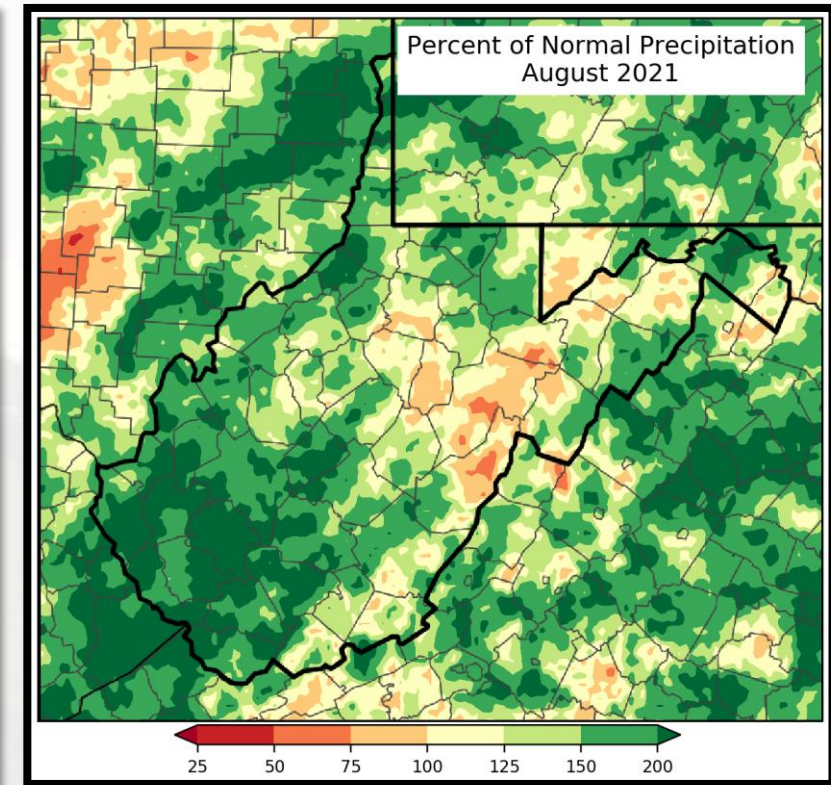
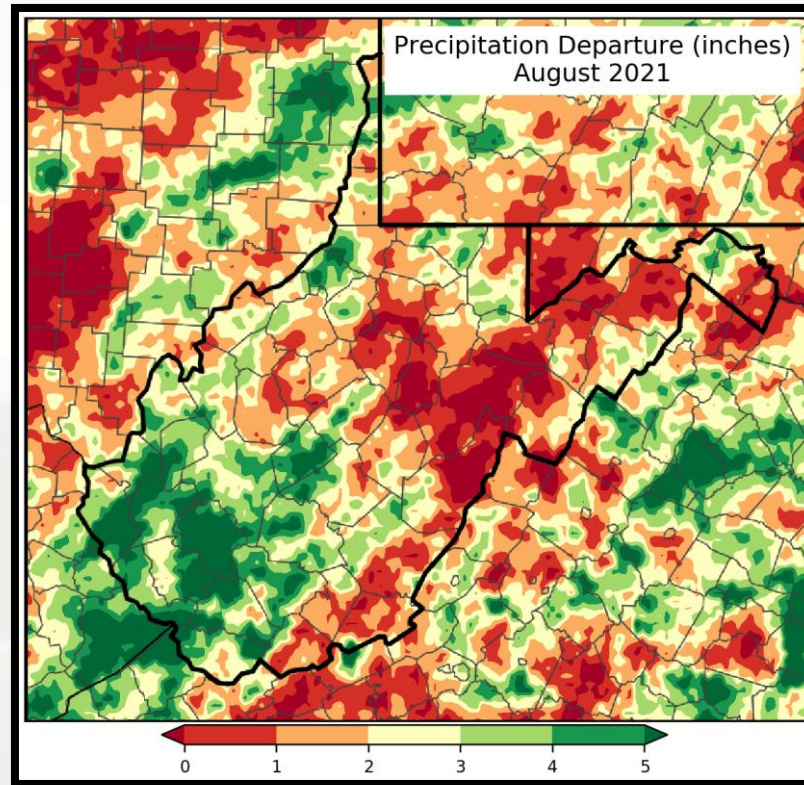
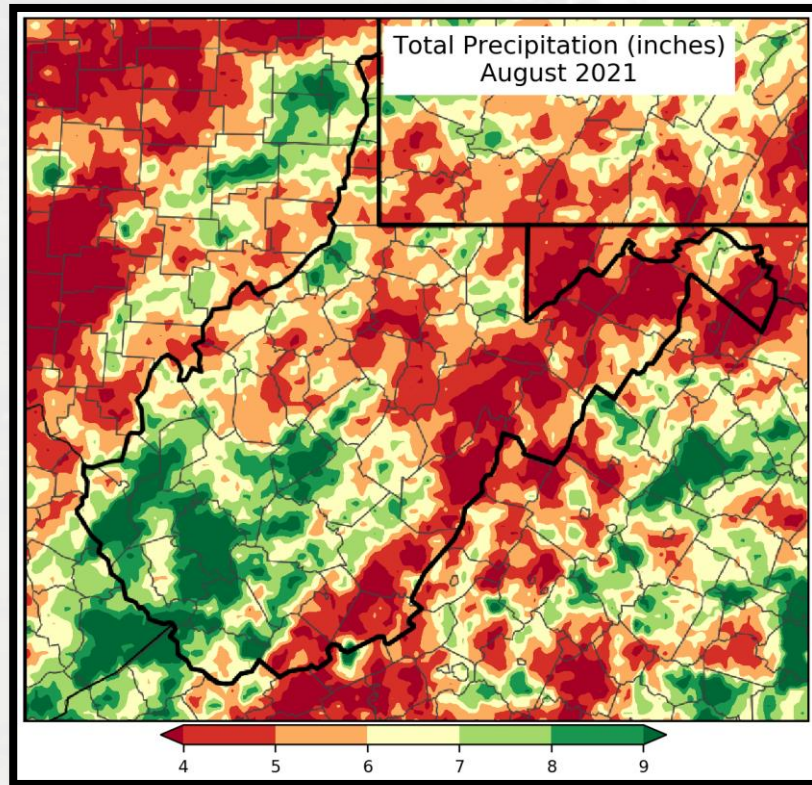
Event summaries for noteworthy events will be provided, along with temperature/precipitation departures for August. A record events list for the month of August, as well as temperature/precipitation outlooks are also included. In addition, temperature/precipitation statistics for meteorological summer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

August 2021 Average Temperature/Departure



Temperatures were above normal areawide, generally ranging from 1-4 degrees above normal depending on location. Average temperatures for the month ranged from the mid 70s for the lowlands, with mid 60s to low 70s for the higher terrain.

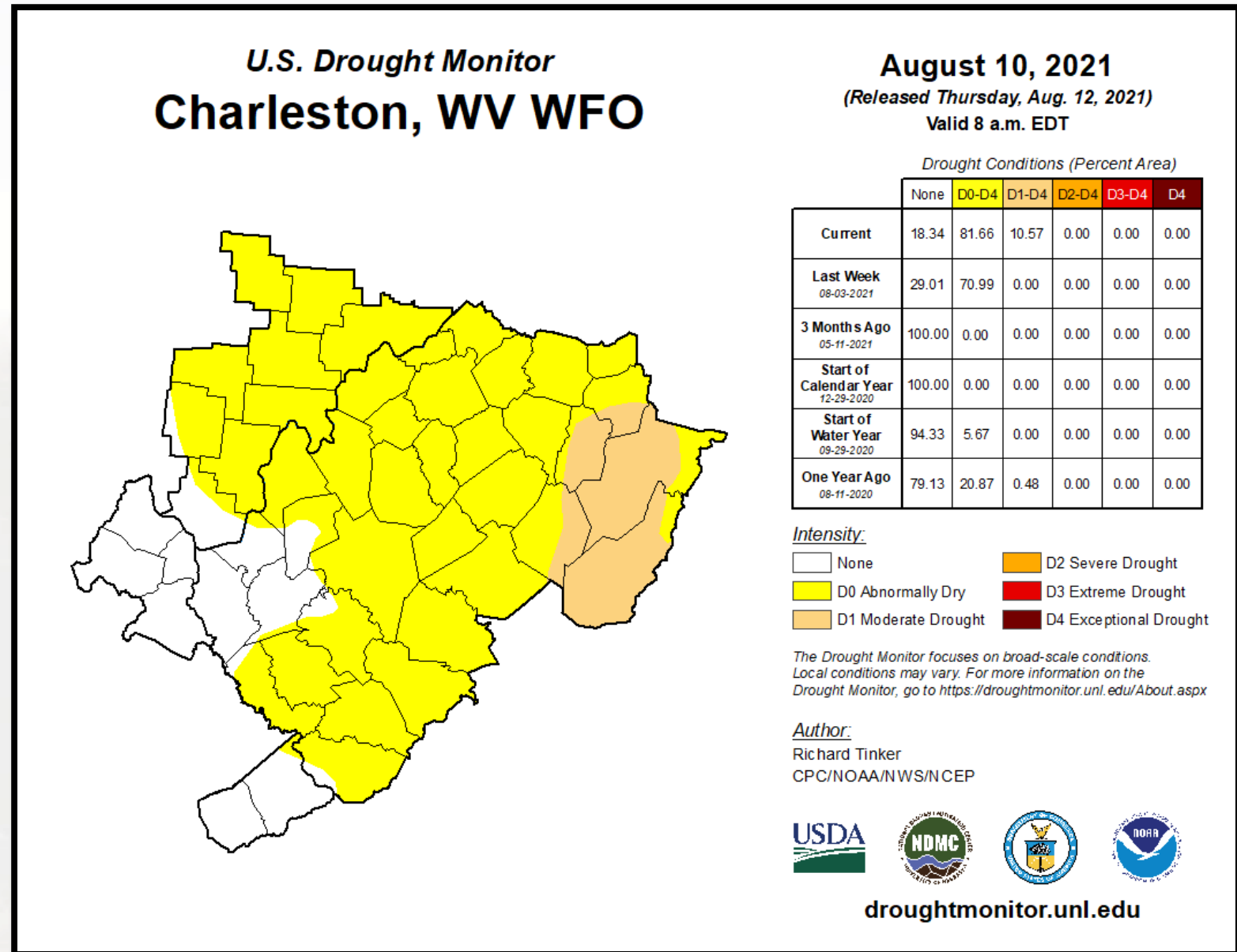
August 2021 Precipitation/Departure/Percent of Normal



August featured a significant spread in precipitation totals, both above and below normal, thanks in part due to the remnants of multiple tropical systems moving through the area. Portions of Central and Western WV, Southwest VA, and sections of Southeast OH received significantly more precipitation compared to parts of the rest of the region. In fact, some of the hardest hit locations in WV had nearly 12" for the month, while other areas further east in the mountains had well less than half of that amount. For example, 11.80" was reported by a location just south of Hurricane (WV) in Putnam County, while Elkins (WV), located well to the east, only had 3.73" in August. This variation in precipitation totals led to some areas being well above normal (> 200%) for the month, while other areas in the mountains only received 50-75% of normal precipitation.

August 2021 Drought Monitor

D0 (abnormally dry) and D1 (moderate drought) areas would increase through the beginning of August, peaking on August 10th (seen right) with approximately 81.7% of the region in a D0 area, and 10.6% of the region in a D1 area (primarily located over the eastern mountains). The remnants of multiple tropical systems moving through the region would ease the dry conditions during the second half of August over much of the region, with the eastern mountains being the one exception where D0/D1 conditions still remained at the end of August.



August 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 | 82.5 | 2.6 | 63.4 | 2.3 | 72.9 | 2.4 |
| Charleston | 87.0 | 1.8 | 67.0 | 2.9 | 77.0 | 2.4 |
| Clarksburg | 85.1 | 0.5 | 64.9 | 2.2 | 75.0 | 1.4 |
| Elkins | 83.8 | 1.7 | 62.0 | 3.6 | 72.9 | 2.7 |
| Huntington | 86.3 | 0.8 | 67.8 | 3.0 | 77.1 | 1.9 |
| Parkersburg | 87.4 | 2.7 | 66.2 | 3.8 | 76.8 | 3.3 |

Abbreviations: Avg, Average

Notes: Temperatures/Departures are in degrees Fahrenheit

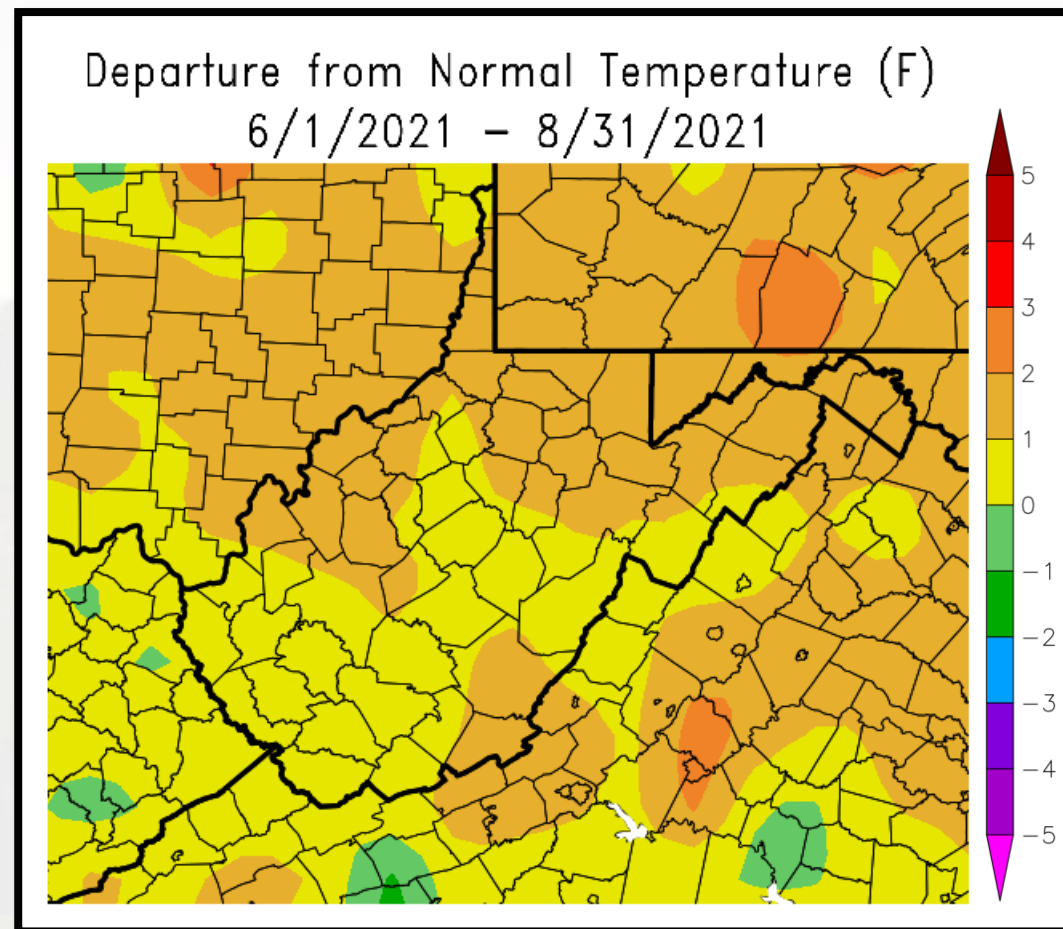
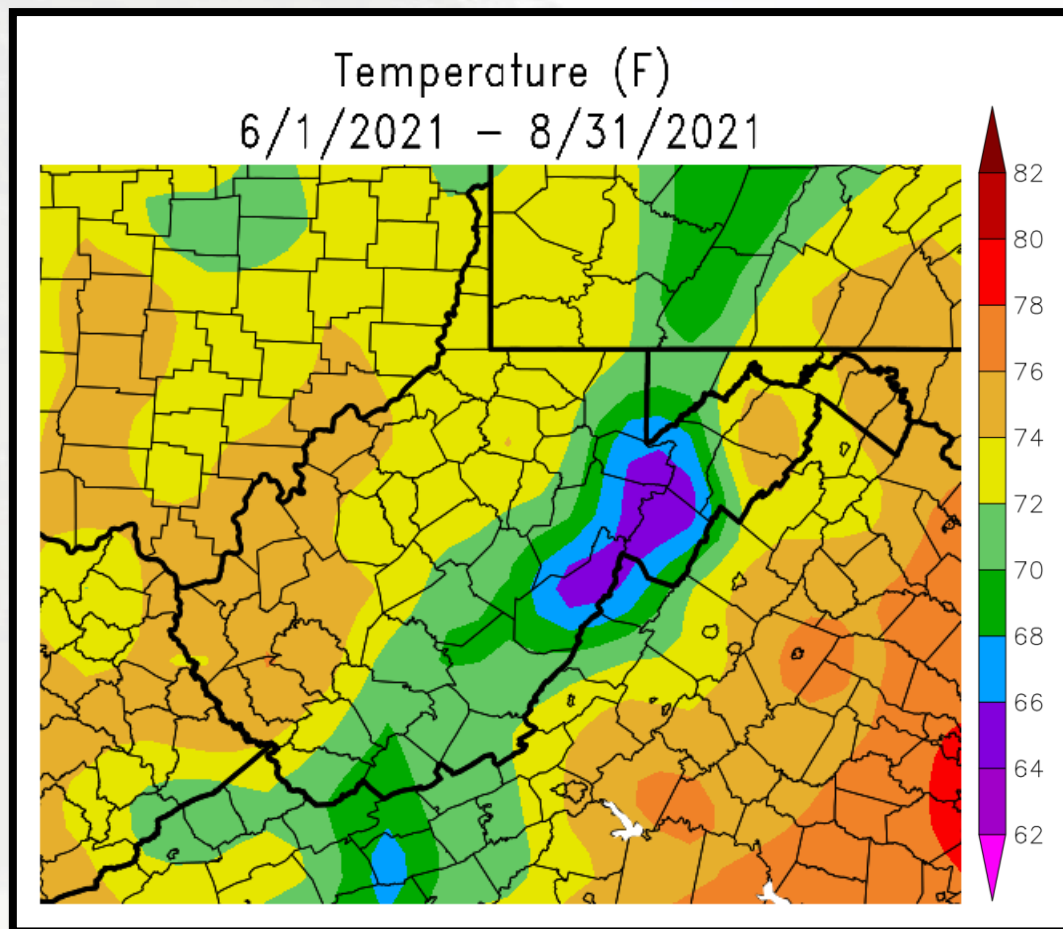
August 2021 Precipitation Statistics for Selected Cities

| | Precipitation | Precipitation Departure | Precipitation Year to Date | Precipitation Year to Date Departure |
|--------------------|---------------|-------------------------|----------------------------|--------------------------------------|
| Beckley | 7.43 | 3.75 | 32.86 | 1.34 |
| Charleston | 6.10 | 2.35 | 29.34 | -3.77 |
| Clarksburg | 3.47 | -0.15 | 25.04 | -6.72 |
| Elkins | 3.73 | -0.14 | 26.59 | -7.59 |
| Huntington | 6.66 | 2.71 | 40.22 | 7.94 |
| Parkersburg | 4.91 | 1.53 | 30.25 | 0.14 |

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

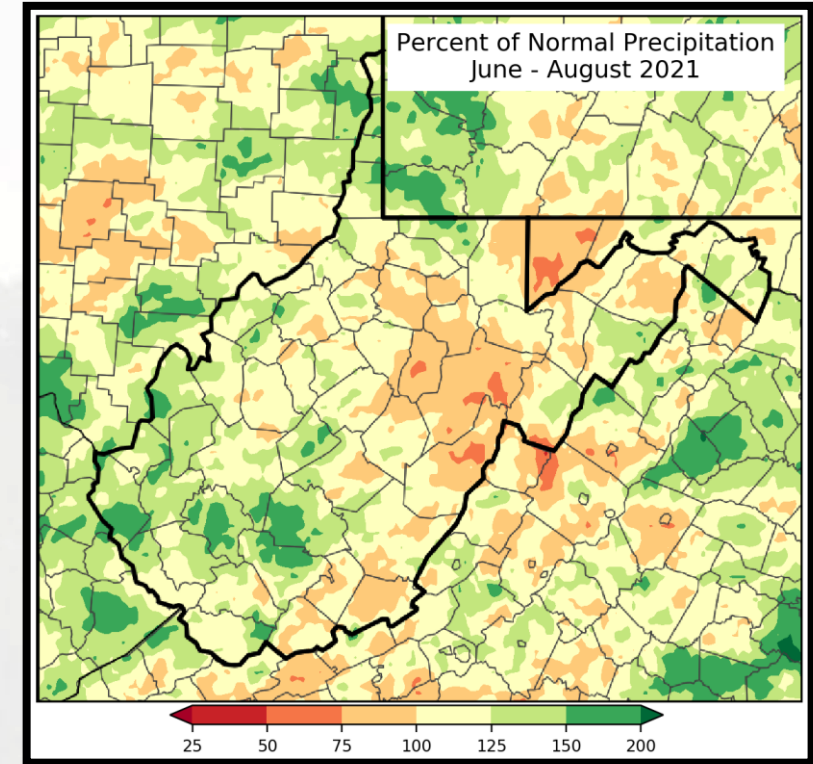
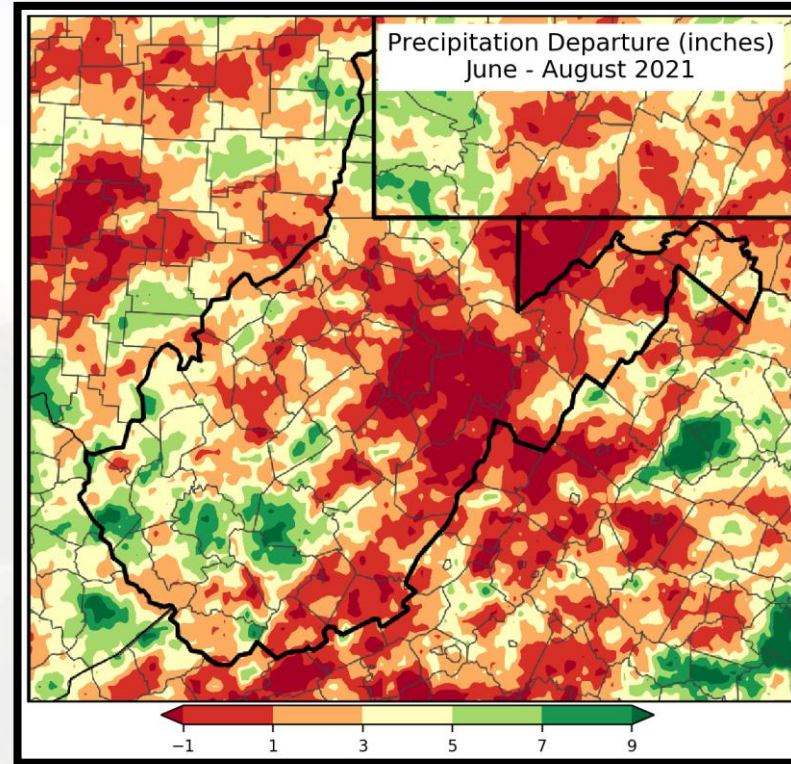
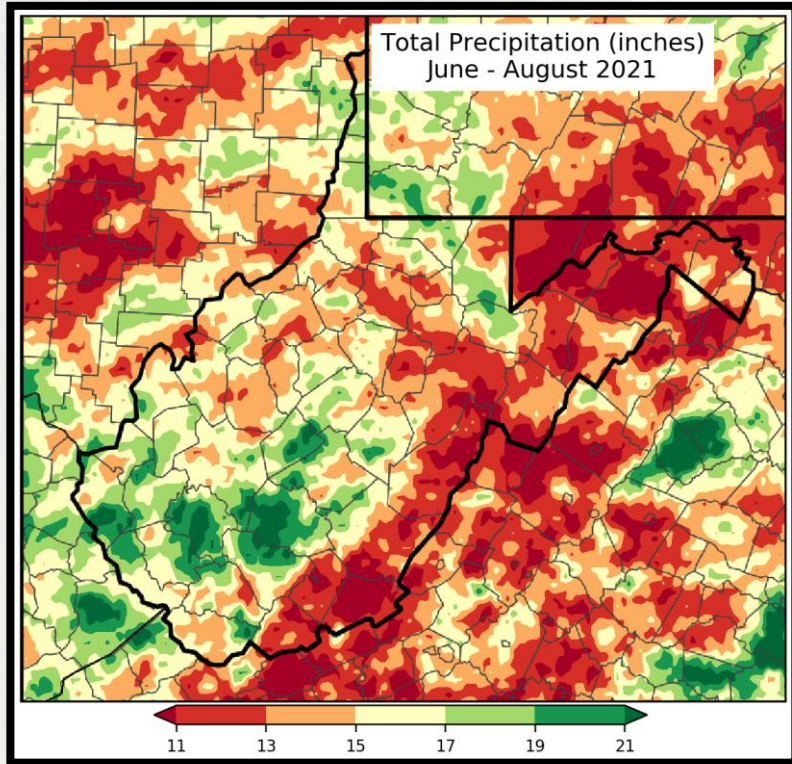
Seasonal Average Temperature/Departure

Summer: From 6-1-2021 to 8-31-2021



Seasonal temperatures for meteorological summer ended slightly above normal for the vast majority of the region, generally ranging within a degree or two above normal. This translated into average temperatures in the low to mid 70s for the lowlands, with mid 60s to low 70s for the higher terrain.

Seasonal Precipitation/Departure/Percent of Normal Summer: From 6-1-2021 to 8-31-2021



Seasonal precipitation for meteorological summer varied significantly across the region, with portions of Northeast KY, Southwest VA, and areas east/south/west of Charleston, WV being the wettest across the region, with some locations receiving over 21" of rainfall, or approximately 150-200% of normal. Other areas, such as across portions of Southeast OH and Northeast WV, received significantly less rainfall, with some areas receiving less than 11" for meteorological summer, or approximately 50-75% of normal. Huntington, WV ended meteorological summer with 22.05" of precipitation, while Elkins, WV had 11.46", nearly half as much!

Seasonal Temperature Statistics for Selected Cities

Summer: From 6-1-2021 to 8-31-2021

| | Avg Maximum Temperature | Avg Maximum Temperature Departure | Avg Minimum Temperature | Avg Minimum Temperature Departure | Average Temperature | Average Temperature Departure |
|--------------------|-------------------------|-----------------------------------|-------------------------|-----------------------------------|---------------------|-------------------------------|
| Beckley | 80.8 | 1.3 | 61.5 | 0.8 | 71.2 | 1.1 |
| Charleston | 85.5 | 0.7 | 64.5 | 0.8 | 75.0 | 0.8 |
| Clarksburg | 83.7 | -0.5 | 62.8 | 0.5 | 73.2 | -0.1 |
| Elkins | 82.4 | 0.6 | 59.5 | 1.7 | 70.9 | 1.1 |
| Huntington | 84.5 | -0.5 | 65.7 | 1.2 | 75.1 | 0.3 |
| Parkersburg | 85.0 | 1.0 | 63.8 | 1.7 | 74.4 | 1.3 |

Abbreviations: Avg, Average

Notes: Temperatures/Departures are in degrees Fahrenheit

Seasonal Precipitation Statistics for Selected Cities

Summer: From 6-1-2021 to 8-31-2021

| | Precipitation | Precipitation Departure | Snowfall | Snowfall Departure |
|--------------------|---------------|----------------------------|----------|-----------------------|
| Beckley | 15.25 | 2.27 | N/A | N/A |
| Charleston | 13.09 | -0.76 | N/A | N/A |
| Clarksburg | 11.67 | -1.89 | N/A | N/A |
| Elkins | 11.46 | -2.88 | N/A | N/A |
| Huntington | 22.05 | 8.82 | N/A | N/A |
| Parkersburg | 14.37 | 2.10 | N/A | N/A |

Abbreviations: N/A, Not Applicable

Notes: All units are in inches.

Record Events for August

- August 3rd: Record low temperature set at Parkersburg, WV. A record low temperature of 53 degrees was set at Parkersburg, tying the old record of 53 degrees set in 1959.
- August 12th: Record high temperature set at Elkins, WV. A record high temperature of 92 degrees was set at Elkins, breaking the old record of 91 degrees set in 1926.
- August 13th: Record high temperature set at Elkins, WV. A record high temperature of 93 degrees was set at Elkins, breaking the old record of 91 degrees set in 1988.
- August 25th: Record daily maximum rainfall set at Beckley, WV. A record rainfall of 1.77" was set at Beckley, breaking the old record of 1.59" set in 1999.

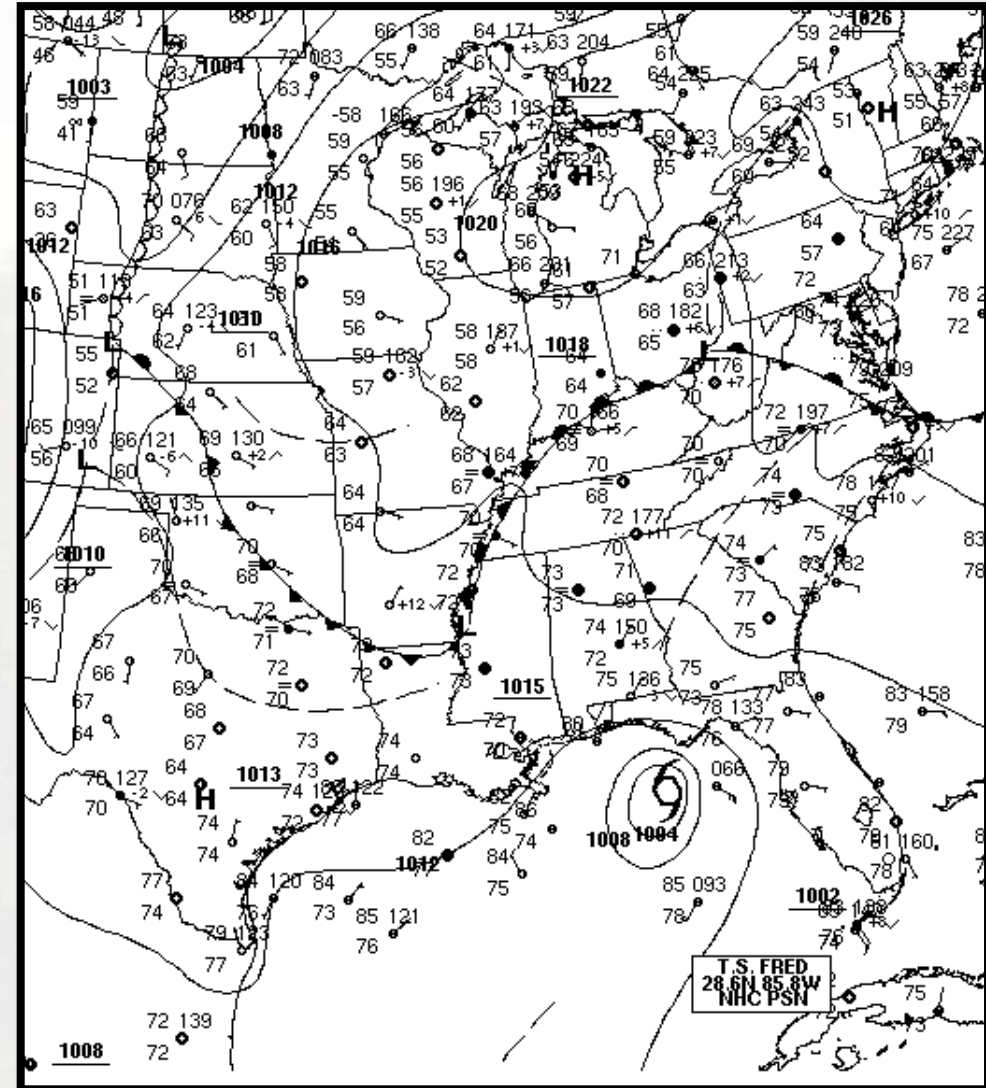
August Noteworthy Events

- August 15-19th Heavy Rain and Flash Flooding in Association with the Remnants of Former Tropical Storm Fred
- August 30th – September 1st Heavy Rain and Flash Flooding in Association with the Remnants of Former Hurricane Ida (Will be covered in September's edition!)

August 15-19th Heavy Rain and Flash Flooding in Association with the Remnants of Former Tropical Storm Fred

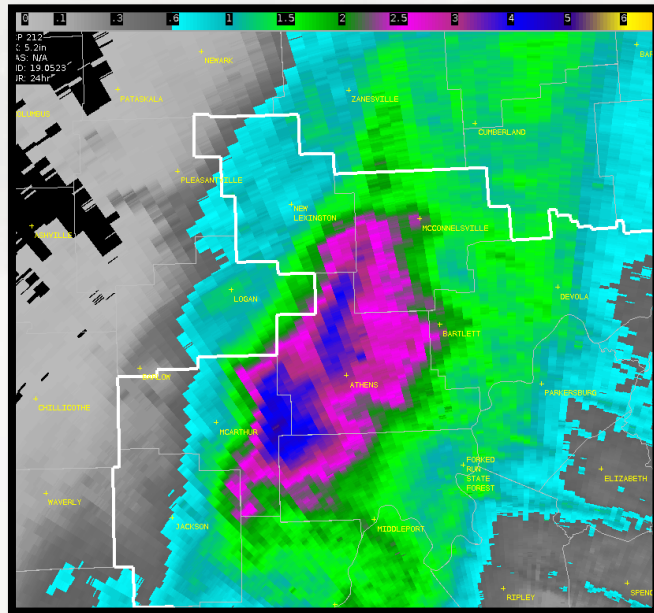
A stagnant frontal boundary would remain parked over the region on August 15-16th, serving as a forcing mechanism amid a favorable airmass for scattered showers and thunderstorms over portions of the area. This would result in 4 flash flood warnings being issued, with several reports of flooding received, and prime the region for more flooding with the remnants of Tropical Storm Fred approaching. A surface analysis chart for August 16th at 7 AM illustrating this setup can be seen right.

Fred would arrive on the morning of August 17th and continue to affect the region through 10 AM the following morning, producing locally heavy rainfall at times. Five additional flash flood warnings were issued on the morning of August 18th, with portions of Southeast Ohio being hit particularly hard, with up to 5.39" of rain reported (Athens, OH). West Central WV and Southeast OH had numerous reports of flooding. A list of precipitation reports from some of the hardest hit locations in the region can be seen on the following page, along with corresponding radar estimated and observed rainfall accumulation images.

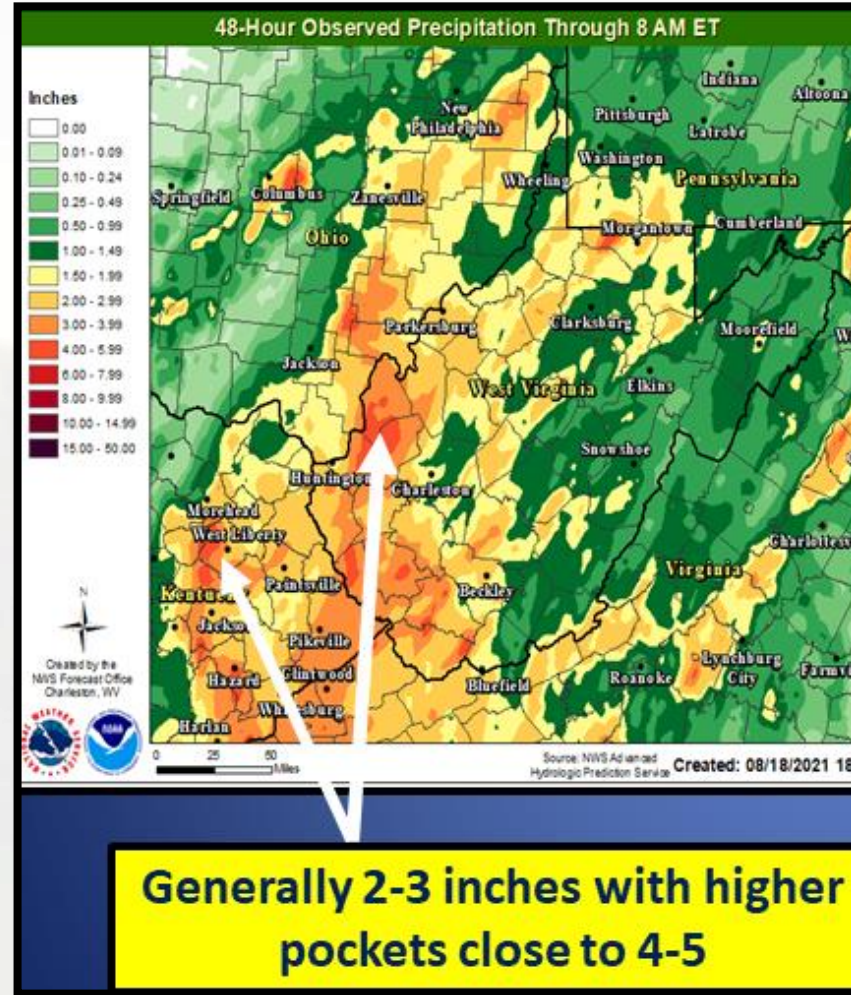


August 15-19th Heavy Rain and Flash Flooding in Association with the Remnants of Former Tropical Storm Fred (Continued)

An upper level disturbance the following day on August 19th would produce additional showers and thunderstorms across the region. Considering the already saturated soil conditions, this resulted in an additional 7 flash flood warnings issued. Flooding was reported across portions of Southeast OH, Southwest VA, Central and Western West Virginia, with isolated rainfall totals of over 2" reported. Select images from the remnants of Tropical Storm Fred at the time of peak impact can be seen on the following page.



Radar estimated rainfall accumulation image for Southeast Ohio, where over 5" of rain fell in some locations.



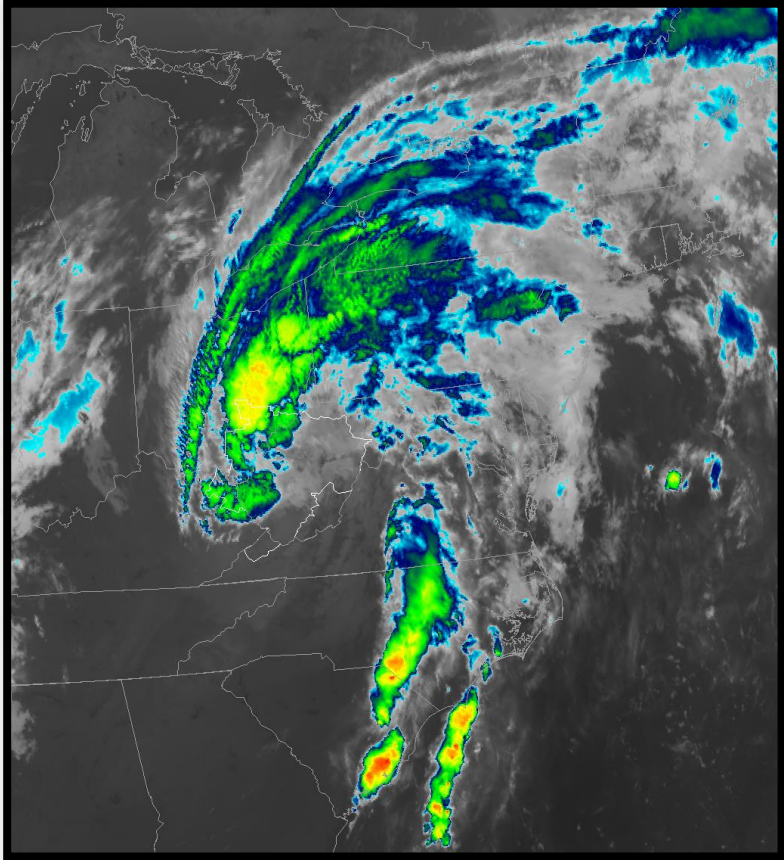
48-hour observed precipitation covering the period from 8 AM August 16th to 8 AM August 18th

Public Information Statement
National Weather Service Charleston WV
1236 PM EDT Wed Aug 18 2021

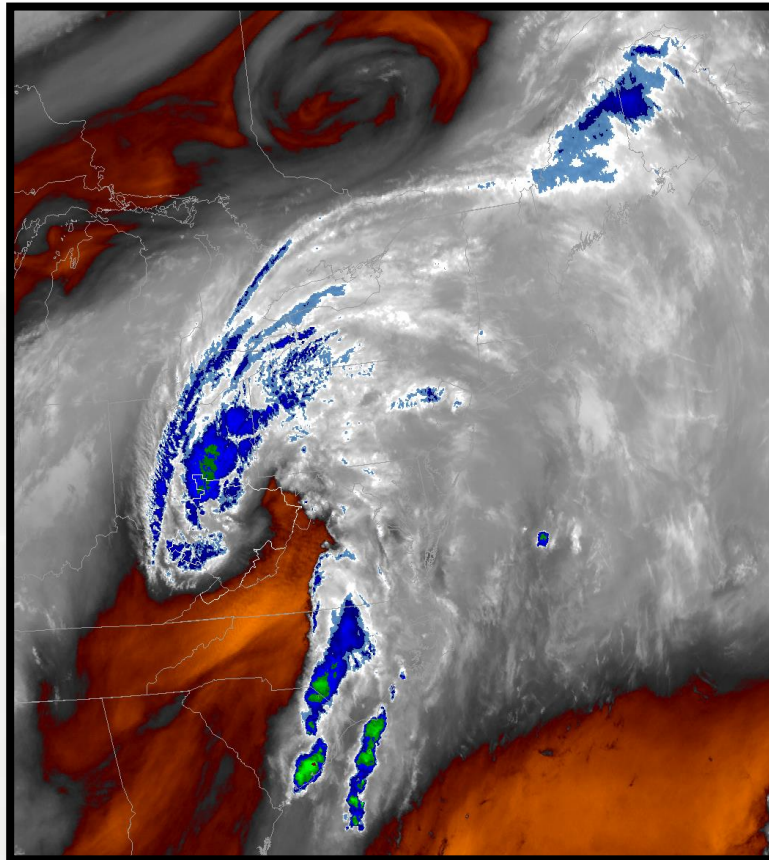
...PRECIPITATION REPORTS...

| Location | Amount |
|----------------------|---------|
| Athens | 5.39 in |
| Athens 6.0 NW | 4.95 in |
| Albany 4.1 NW | 4.78 in |
| Albany 4.5 WNW | 4.65 in |
| 1.7 W Delbarton | 4.27 in |
| Athens 4.6 ESE | 3.78 in |
| Glouster | 3.68 in |
| Williamson | 3.56 in |
| Athens 7.0 WNW | 3.54 in |
| 2.7 SE Buffalo | 3.52 in |
| Nora 4 SSE | 3.52 in |
| 2.4 W Vansant | 3.51 in |
| The Plains | 3.44 in |
| Glouster 5.7 NE | 3.41 in |
| 5.0 SW Hamlin | 3.39 in |
| Athens 1.3 N | 3.38 in |
| 6.2 NE Coeburn | 3.35 in |
| Amesville 2.6 SE | 3.35 in |
| 5.0 W Gallipolis | 3.32 in |
| Albany | 3.31 in |
| Albany 0.6 NW | 3.22 in |
| Stewart 4.6 NNE | 3.21 in |
| 8.5 E Crown City | 3.16 in |
| Haysi | 3.02 in |
| Gallipolis | 2.99 in |
| 6 NE Oak Hill | 2.95 in |
| Nelsonville 1.4 W | 2.93 in |
| 1 W Nelsonville | 2.89 in |
| Athens 2.3 SSE | 2.84 in |
| Culloden 0.5 WSW | 2.83 in |
| Vinton Furnace | 2.79 in |
| St. Albans 5.1 WSW | 2.78 in |
| 5.8 E Leon | 2.76 in |
| Haysi 3 NW | 2.75 in |
| Point Pleasant 5.8 E | 2.66 in |
| Hurricane 1.6 SSW | 2.61 in |
| Lakin | 2.59 in |
| Trimble | 2.54 in |
| Upper Falls | 2.53 in |
| Grundy | 2.53 in |
| Ona | 2.51 in |
| Hurricane | 2.49 in |
| 2 SE Haysi | 2.49 in |
| 8.0 W Glen Daniel | 2.48 in |
| 2.2 SE Toonerville | 2.44 in |
| 4.6 S Washington | 2.40 in |
| 7.4 NW Cleveland | 2.39 in |
| 0.7 N Davenport | 2.37 in |
| Zaleski | 2.37 in |

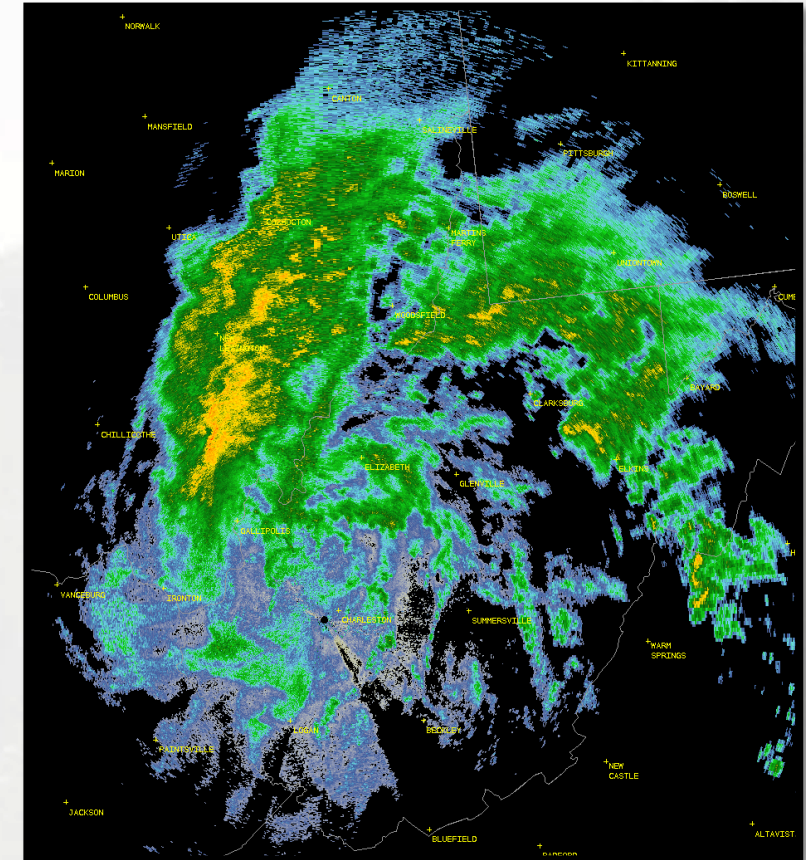
August 15-19th Heavy Rain and Flash Flooding in Association with the Remnants of Former Tropical Storm Fred (Continued)



Infrared Satellite Image
from 7:01 AM August 18th

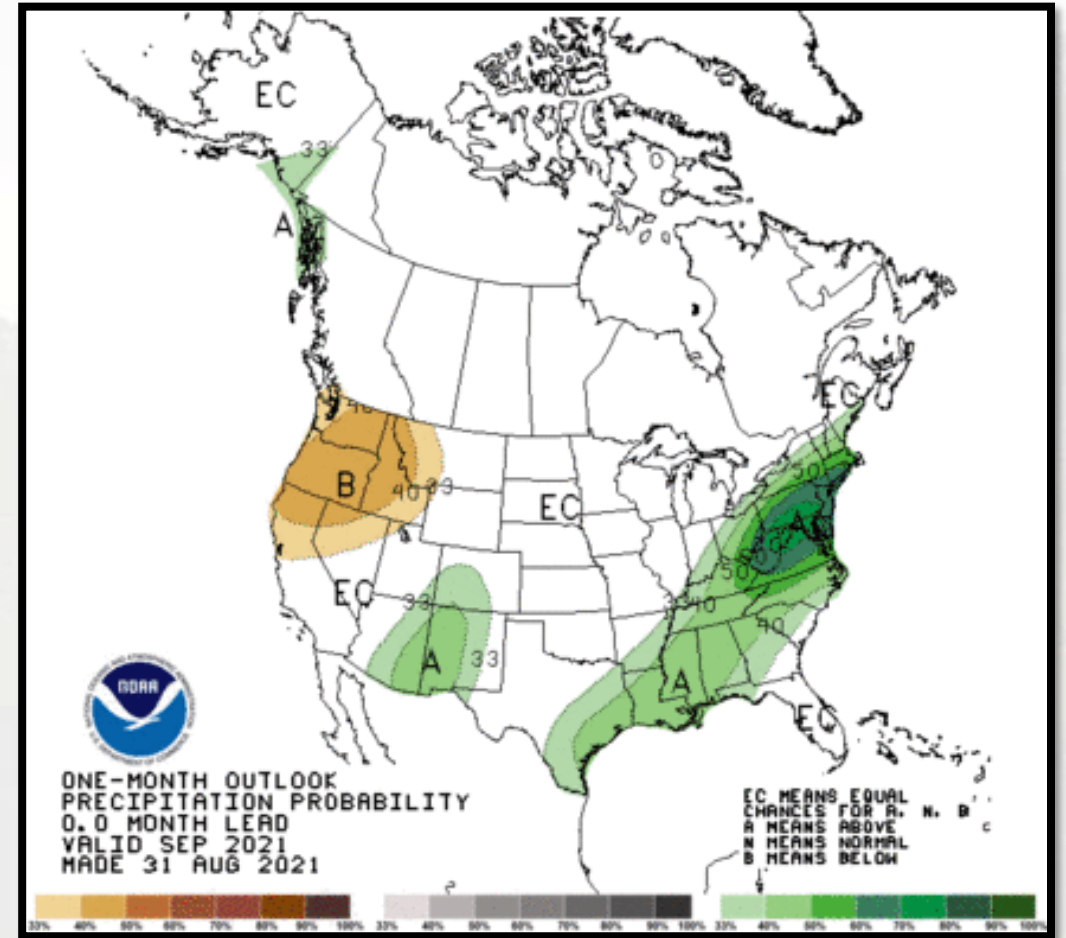
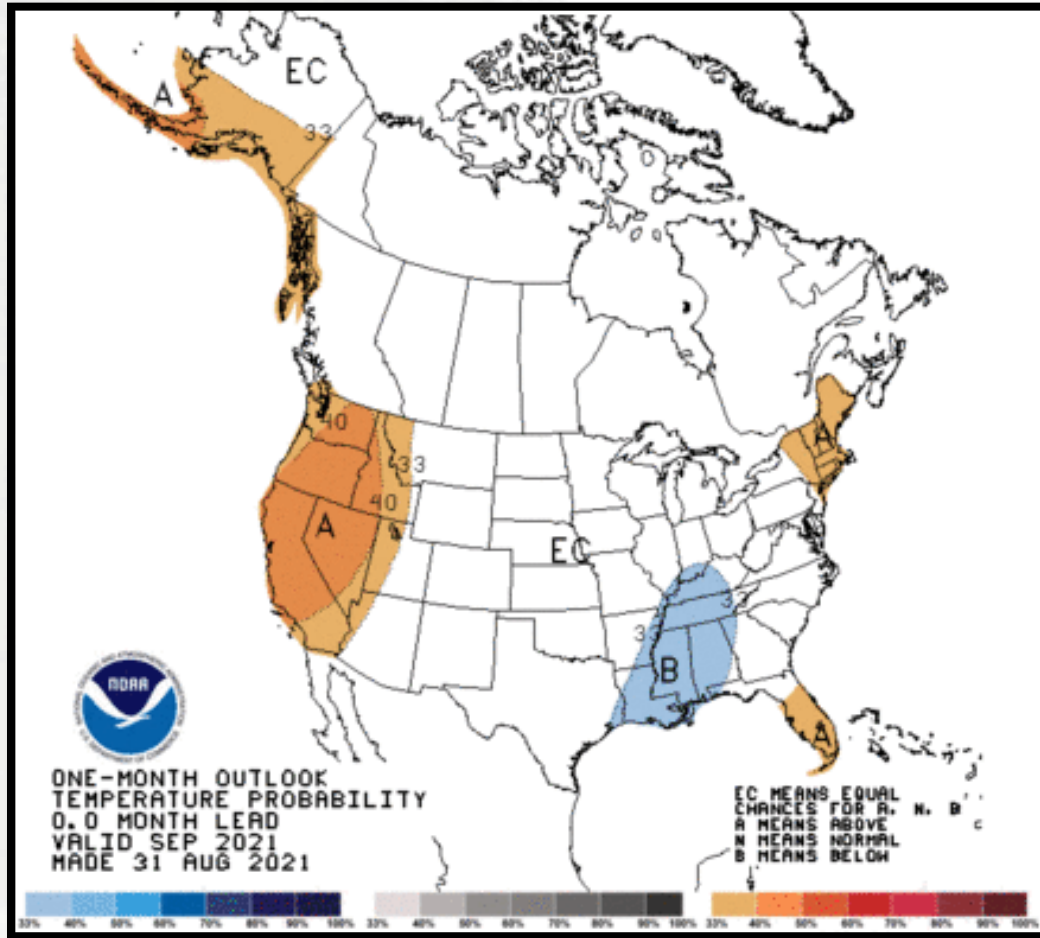


Water Vapor Satellite Image
from 7:01 AM August 18th



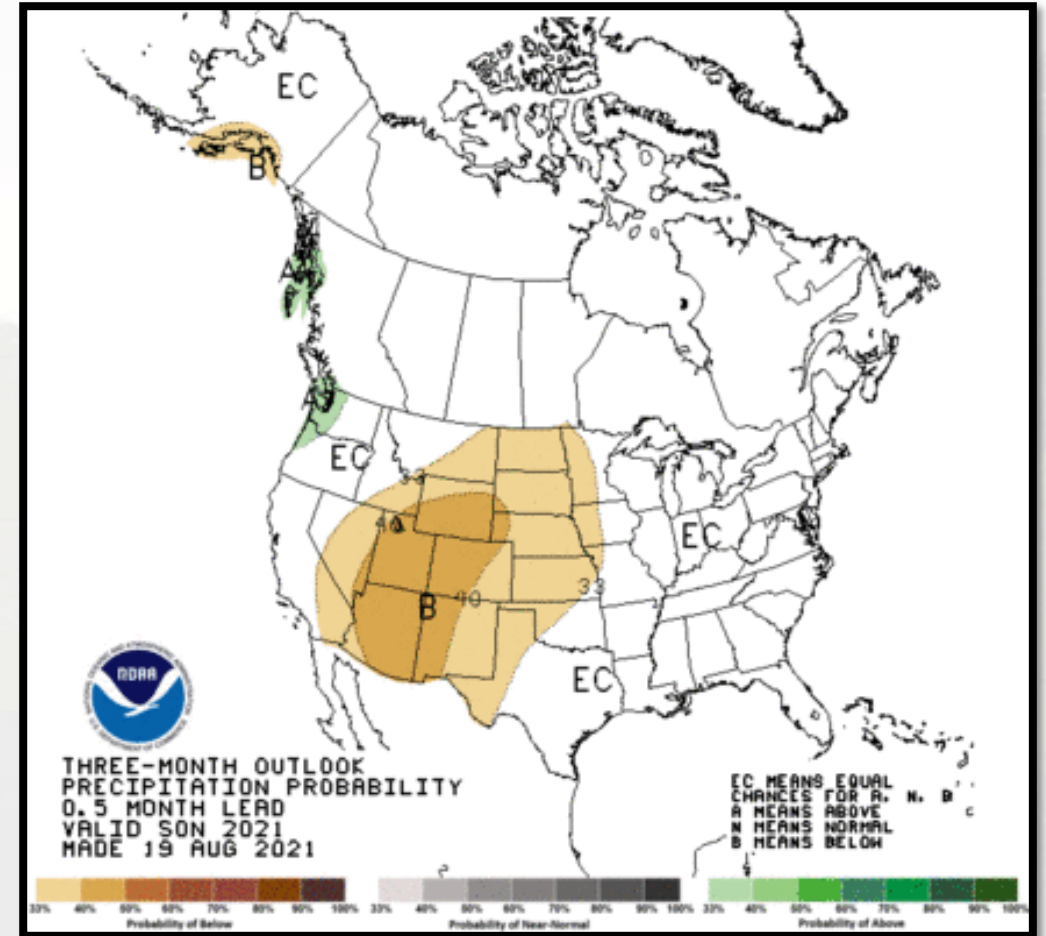
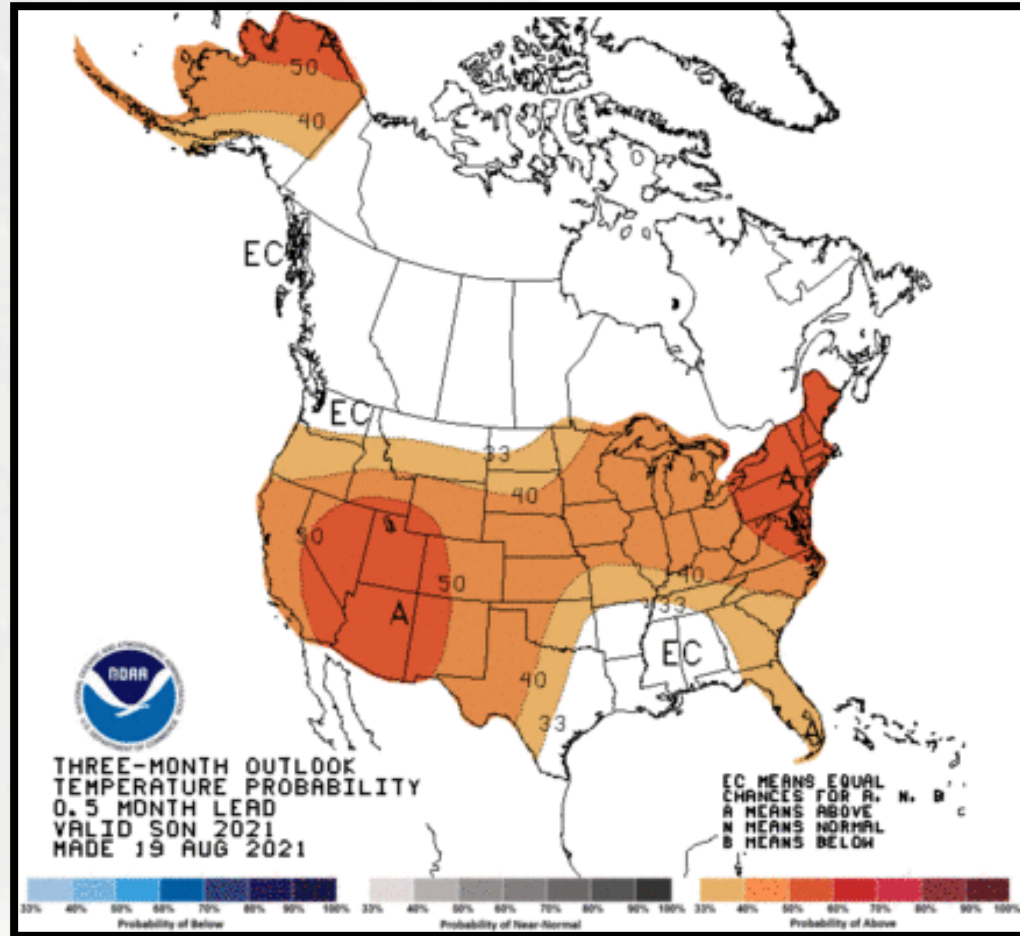
Base Reflectivity Image at
~ 6 AM August 18th

September 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).

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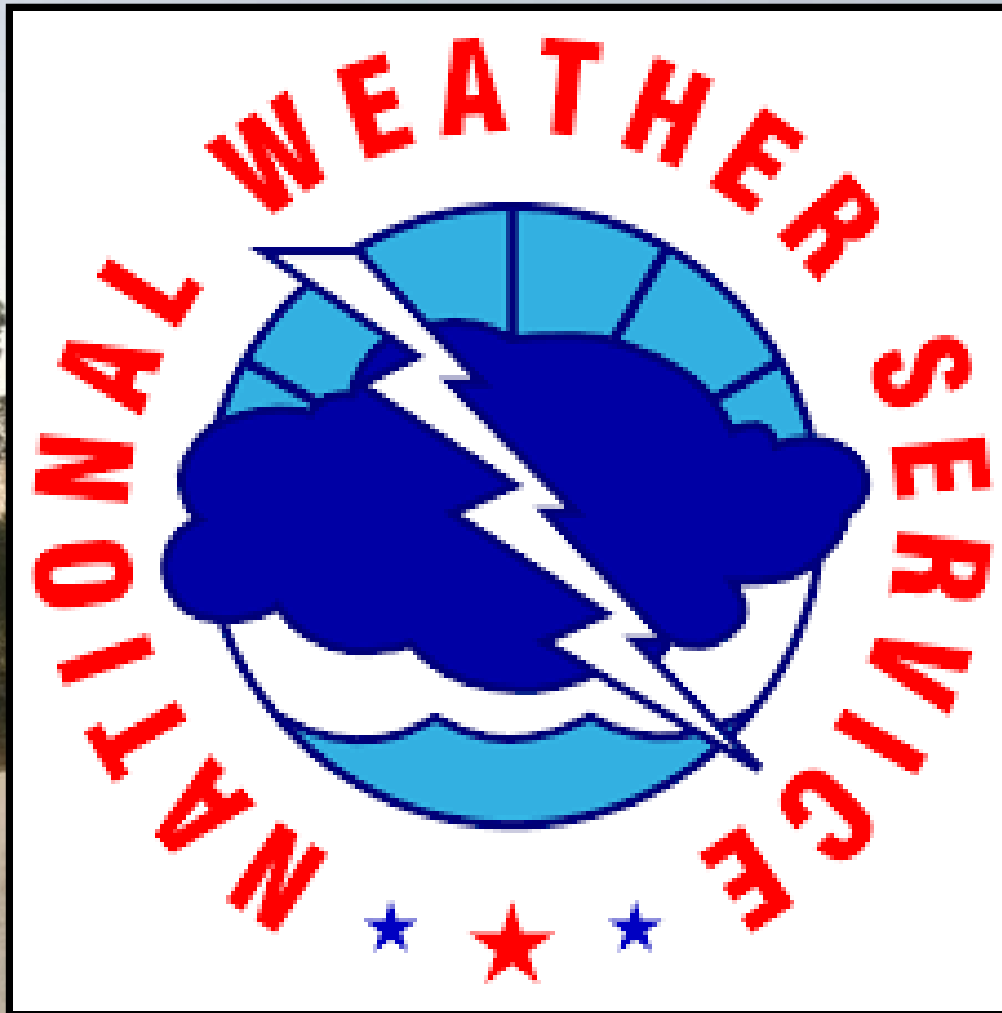
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