

September 2023 Climate Review

Temperature Overview

September 2023 featured near to slightly warmer than normal temperatures across the local area, though the month had a clear cut pattern with a hot start followed by a cool finish. Across the continental US, the pattern was dominated by a strong upper-level ridge that was mostly in place across the central portion of the nation, with an upper-level trough often anchored from the Great Basin into California (see Figure 1 for national temperature departures). Regionally, the state of Virginia was classified as being “above average” with 2023 ranking as the 40th warmest September on record; Maryland had its 20th warmest, while North Carolina was “near average” with 2023 being the 55th warmest (period of record is 129 years 1895-2023). Locally, average temperatures were at least 2 degrees warmer than the long-term means at the Richmond, Salisbury, and Wallops Island sites, but the majority of stations were within one degree of normal (see table on page 3).

Looking at daily high temperature departures at Richmond and Norfolk (Figure 3), the month turned hot starting on the 3rd and generally remained well above average through the next 10 days. Most locations experienced their highest daytime temperatures for the year on the 6th and 7th when highs ranged from the mid 90s to around 100 degrees. The hot spot was the Richmond Airport where the high reached 101F on the 6th and 100F on the 7th, the first 100-degree temperatures at Richmond since July 2020. Rather surprisingly, these 2 days did not set daily high temperature records since the dates coincided with a heat wave back in 1954; the 98F on the 4th being the only daily record high at RIC for the month. Salisbury tied a record high on the 5th (95F), and set new record highs on the 6th and 7th (both days reaching 97F). Elizabeth City reached 95F on the 7th, tying a record high for the date, while the light wind regime allowed for enough onshore flow at the immediate coast to keep Norfolk from challenging any record highs. Temperatures trended near normal during the middle of the month, followed by cooler than normal conditions from the arrival of Tropical Storm Ophelia on the 22nd and 23rd through the end of the month. The tally for number of days with a high 5 or more degrees above normal and below normal was 12 warm vs. 6 cool at Richmond and 6 warm vs. 8 cool at Norfolk.

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Precipitation Overview

September 2023 rainfall was variable across the region, with a fairly dry first 3 weeks of the month that turned wet when Tropical Storm Ophelia pushed through from the 22nd to the 23rd, bringing widespread rainfall amounts in the 2 to 4” range across the region. The daily rainfall of 2.76” at Richmond and 2.83” at Salisbury both set new daily records on the 23rd, with Elizabeth City setting a daily record on the 22nd when 2.92” was recorded. Many places received at least half of their monthly totals from Ophelia with the rest of the month being relatively dry. The maps on page 6 highlight where the heavier precipitation fell (centered inland across the I-95 corridor where monthly totals were mostly above normal), with lower rainfall totals across the far west and along the coast from the Virginia eastern shore south through Hampton Roads and coastal northeast North Carolina. At the end of the month, the Virginia eastern shore was classified as being in moderate drought, with abnormally dry status along the west shore of the Bay and into portions of northeast North Carolina.

Severe weather was observed on the 7th, 8th, and 9th (primarily in wind damage with a few reports of large hail) at the tail end of the heat wave as a frontal boundary approached from the west and lingered across the region. Most notable was wind damage that led to numerous power outages across metro Richmond on the evening of the 7th as a cluster of severe storms passed through. After the 9th, the weather was generally quiet until Tropical Storm Ophelia pushed in from the south on the 22nd. A lone spin-up tornado (EF-0) was verified in Perquimans County, NC during the morning hours on the 22nd. This tornado was brief and did not result in any damage.

The following table on page 3 shows detailed temperature and precipitation statistics for September 2023 at many locations within the Wakefield CWA. Page 4 shows national temperature departures and rankings. On page 5, daily high temperature departures are shown at Richmond and Norfolk, followed by monthly precipitation maps (page 6), with daily records set during the month at our 4 main climate sites on the last page.

Tabular Summary of Data for Selected Climate Sites (September):

September 2023 Temperature Summary Data															* also on other dates			All Normals are 1991-2020		
Site	Avg Max		Avg Min		Avg Temp		Daily Highs					Daily Mins					Remarks			
	(°F)		(°F)		(°F)		Warmest (°F)			Coldest (°F)		Warmest (°F)			Coldest (°F)					
	Actual	Dep	Actual	Dep	Actual	Dep	Actual	Date	Dep	Actual	Date	Dep	Actual	Date	Dep					
Richmond	83.3	2.1	63.1	2.0	73.2	2.0	101	6th	8	68	*28th	1	75	5th	3	54	16th	5		
Norfolk	80.9	-0.5	68.0	1.4	74.4	0.4	96	7th	4	67	*29th	-2	78	7th	3	60	2nd	4		
Salisbury	81.3	1.8	62.3	2.4	71.8	2.1	97	*7th	6	65	26th	-1	75	8th	2	52	2nd	8		
Wallops Island	81.4	2.7	65.1	2.1	73.3	2.5	96	6th	7	67	26th	0	75	5th	1	55	2nd	5		
Elizabeth City	82.9	1.1	64.8	-0.1	73.8	0.4	96	6th	4	72	*30th	0	75	7th	0	53	16th	1		
Ashland, VA	79.6	0.4	60.8	1.3	70.2	0.9	95	7th	5	66	28th	0	71	7th	0	50	16th	5		
Corbin, VA	79.4	0.4	59.1	0.7	69.3	0.6	97	7th	6	61	25th	-4	71	7th	0	49	16th	6		
Louisa, VA	80.3	1.3	56.1	-0.2	68.2	0.6	94	*6th	3	67	*27th	0	66	8th	-3	44	16th	4		
Painter, VA	80.5	0.2	63.2	1.1	71.8	0.6	93	7th	4	67	*30th	-3	73	8th	-2	50	16th	1		
Wakefield, VA	81.5	-0.3	61.5	1.3	71.5	0.5	97	7th	5	66	27th	-3	74	7th	2	49	16th	3		
Williamsburg, VA	81.1	0.6	63.8	0.7	72.4	0.6	97	6th	6	67	*28th	-2	74	7th	1	55	16th	5		
Edenton, NC	80.3	-1.2	65.4	0.3	72.9	-0.4	93	5th	3	71	*30th	-1	77	7th	3	56	16th	4		

September 2023 Precipitation & Snowfall Summary Data												* also on other dates			All Normals are 1991-2020			
Site	Total Pre		# Pre Days		# Pre Days		Greatest		Total Snow		# Snow Days		# Snow Days		Greatest		Remarks	
	(in.)		(≥0.01")		(≥0.10")		(in.)		(in.)		(≥0.1")		(≥1.0")		(in.)			
	Actual	Dep	Actual	Dep	Actual	Dep	Act	Date	Act	Dep	Act	Dep	Act	Dep	Daily	Date		Storm
Richmond	4.99	0.38	10	1	8	2	2.76	23rd										
Norfolk	2.89	-2.51	8	-1	3	-3	1.77	22nd										
Salisbury	5.79	1.31	11	2	8	2	2.83	23rd										
Wallops Island	2.96	-1.37	11	3	3	-3	1.99	23rd										
Elizabeth City	3.87	-0.65	9	-1	4	-2	2.92	22nd										
Ashland, VA	6.67	2.48	8	0	6	0	2.61	23rd										
Corbin, VA	6.30	1.64	11	3	5	-1	4.01	23rd										
Louisa, VA	3.90	-0.59	8	-2	4	-2	1.69	23rd										
Painter, VA	3.17	-1.36	3	-5	3	-2	2.54	23rd										
Wakefield, VA	5.19	-0.86	11	2	5	-1	2.29	23rd										
Williamsburg, VA	5.84	0.44	13	3	9	3	2.92	23rd										
Edenton, NC	5.43	-0.19	8	0	5	-2	2.61	23rd										

* **“Dep”= Departure** from the 30-year normals (1991-2020). Temperature departures are shaded orange for 1 F or more warmer than average (dark red for 4 F or greater anomalies) and blue for 1 F or more cooler than average (dark blue for 4 F or more below normal). Similarly, precipitation departures are shaded green for 0.50” or more wetter than average (dark green for 2.00” or more) and tan for 0.50” or more drier than average (dark brown for 2.00” or more drier). Snowfall departures are shaded purple for 1” or more above average and tan for 1” or more below average.

National Temperature Departure: September 2023

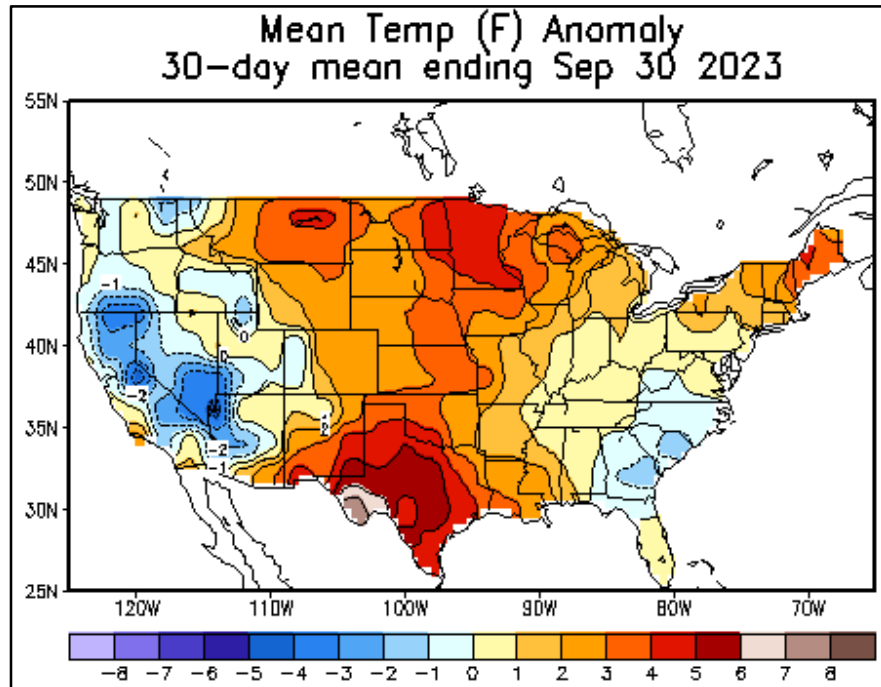


Figure 1: (source: CPC)

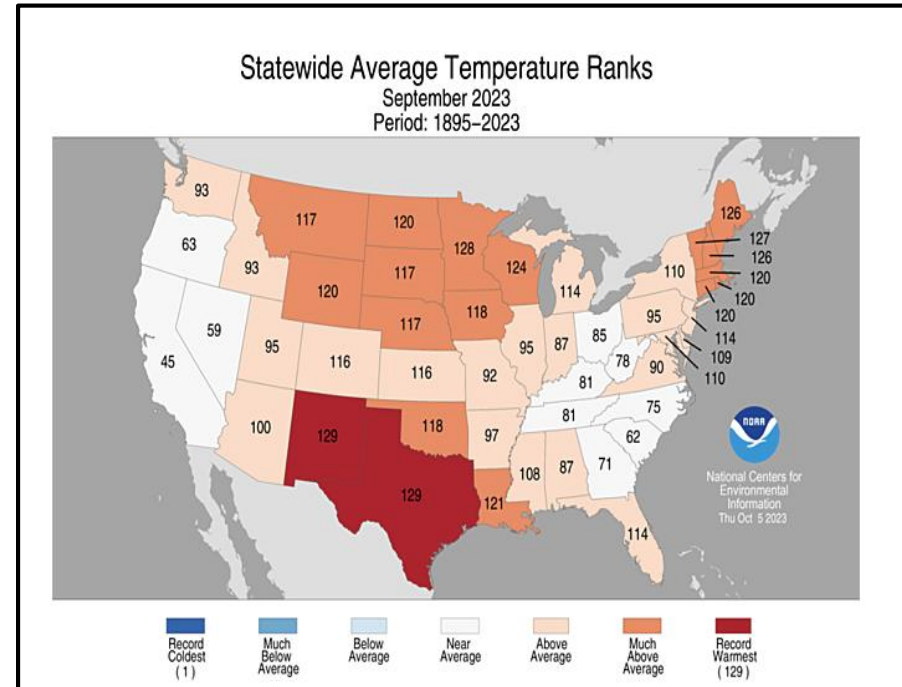


Figure 2: (source: NCEI)

Daily High Temperature Departures at Richmond & Norfolk, VA

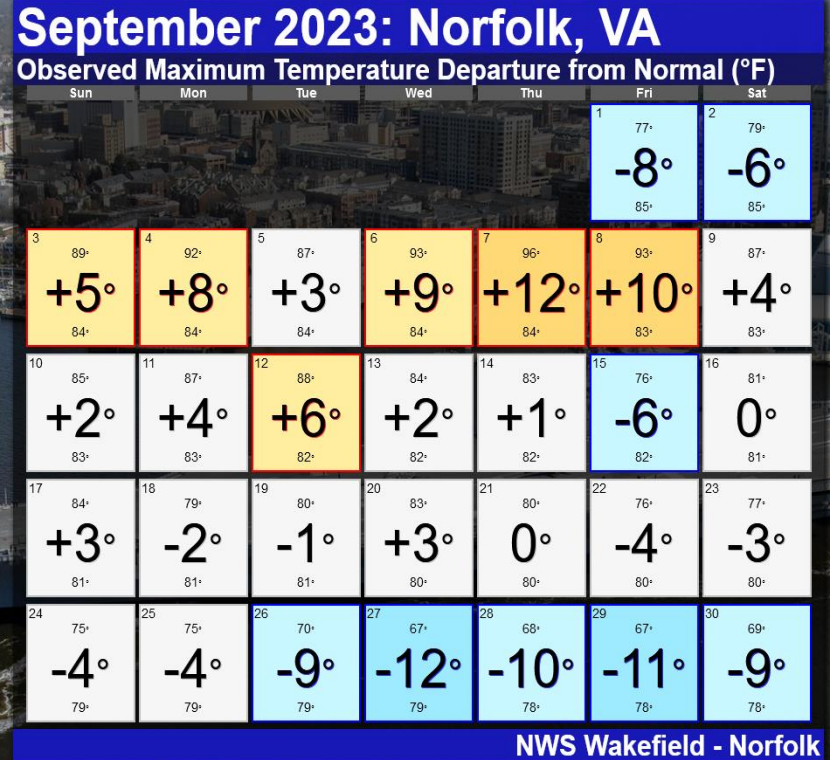
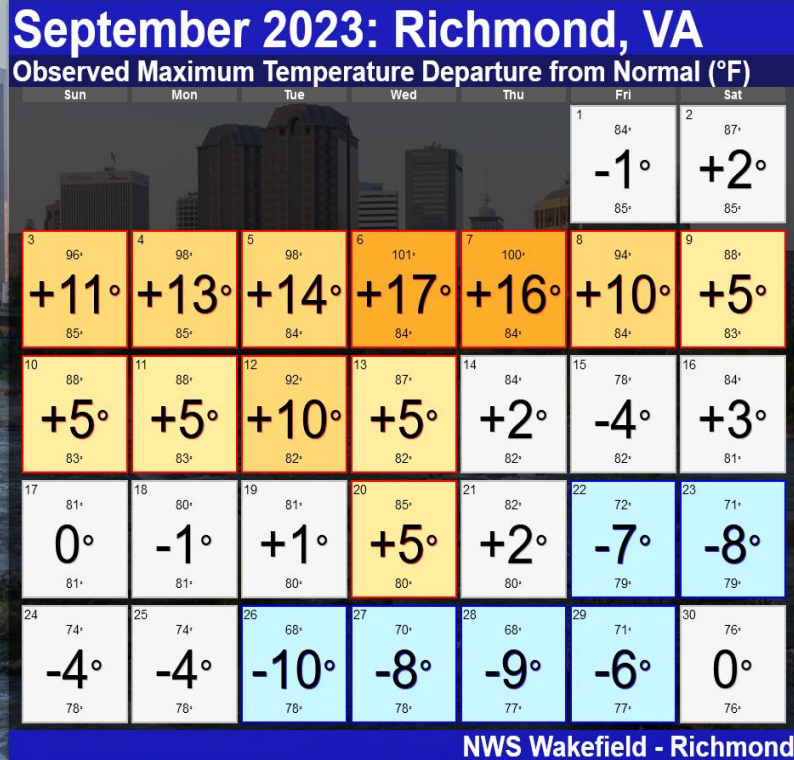
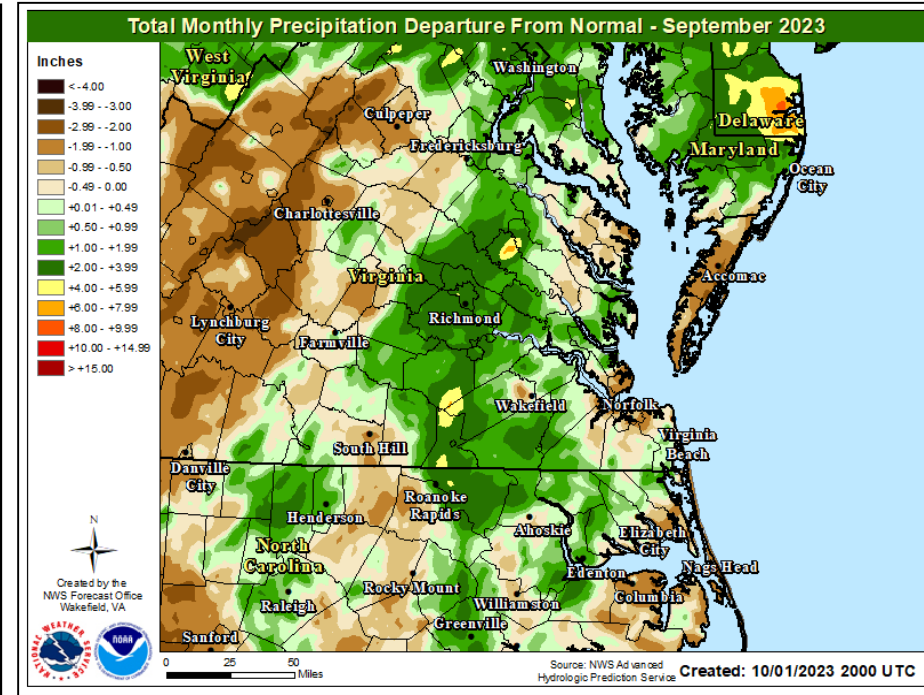
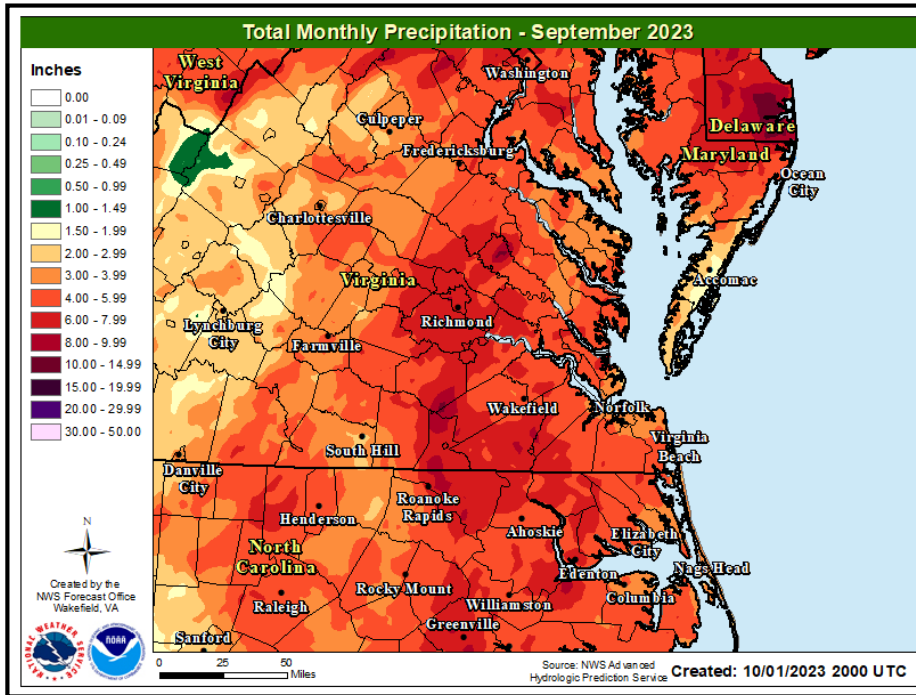


Figure 3: Daily High Temperature Departures at RIC and ORF

Regional Precipitation Maps: September 2023



Total Precipitation for the month is shown in the map on the left. **Departures** from the 30-year normals (1991-2020) are shown on the map on the right.

Daily Records for Long Term Climate Sites (September):

Norfolk, VA Records (Period of Record 150 yrs./1874-2023)

**tie*

Record Highs: none set.

Record Low Maximums: none set.

Record Lows: none set.

Record High Minimums: 78 *(7th).

Daily Precipitation: none set.

Richmond, VA Daily Records (Period of Record 127 yrs./1897-2023)

**tie*

Record Highs: 98 (4th).

Record Low Maximums: none set.

Record Lows: none set.

Record High Minimums: 75 (5th).

Daily Precipitation: 2.76" (23rd).

Salisbury, MD Daily Records (Period of Record 117 yrs./1907-2023)

**tie*

Record Highs: 97 (7th), 97 (6th), 95 *(5th).

Record Low Maximums: none set.

Record Lows: none set.

Record High Minimums: none set.

Daily Precipitation: 2.83" (23rd).

Elizabeth City, NC Daily Records (Period of Record 90 yrs./1934-2023)

**tie*

Record Highs: 95 *(7th).

Record Low Maximums: none set.

Record Lows: none set.

Record High Minimums: none set.

Daily Precipitation: 2.92" (22nd).