

## IOWA MONTHLY WEATHER SUMMARY – JULY 2021

General Summary: Temperatures averaged 73.4 degrees equaling the 1991-2020 climatological normal while precipitation totaled 3.99 inches or 0.18 inch below normal. July 2021 ties 1896, 1978 and 2008 as the 58<sup>th</sup> coldest (92<sup>nd</sup> warmest) July in 149 years of statewide records; it also ties 1977 as the 64<sup>th</sup> wettest (86<sup>th</sup> driest) on record. July 2020 was warmer and drier while a colder and wetter July last occurred in 2018 and 2016, respectively.

Temperatures: Conditions during the first half of July were generally cooler than average with the period between the 12<sup>th</sup> and 18<sup>th</sup> 4.4 degrees below normal. It wasn't until the end of the month that sweltering temperatures returned, as daytime highs during the last week were in the mid to upper 90s along with dew point temperatures in the 70s. These conditions, combined with smoke from western and Canadian wildfires, led to air quality issues.

July's statewide average maximum temperature was 83.8 degrees, 0.1 degree below normal while the average minimum temperature was 63.0 degrees, 0.1 degree above normal. Spencer Municipal Airport (Clay County) observed the month's high temperature of 99 degrees on the 28<sup>th</sup>, 15 degrees above normal. Estherville Municipal Airport (Emmet County) reported the month's low temperature of 48 degrees on the 8<sup>th</sup>, 12 degrees below normal.

Cooling Degree Days: Home cooling requirements, as estimated by cooling degree day totals, averaged 16% less than last July and near the 1991-2020 climatological normal. Cooling degree day totals since January are running 3% less than last year at this time and 13% more than normal.

Precipitation: While widespread rain fell across Iowa, only the southern and western thirds of the state reported above normal totals. Several National Weather Service and Community Collaborative Rain, Hail and Snow (CoCoRaHS) gauges in south-central Iowa measured more than three inches of above-average rainfall. Northeastern Iowa observed the driest conditions with two to three inch deficits from Cedar Rapids to Waterloo and west to Marshalltown; deficits on the order of an inch were found generally east of I-35 and north of I-80.

After Independence Day fireworks fizzled out during the early morning hours, a narrow line of thunderstorms pushed into north-central Iowa, dissipating by sunrise. A handful of stations reported rain with Northwood (Worth County) measuring 0.70 inch. A thin line of strong thunderstorms with locally heavy downpours formed across extreme northern Iowa later in the evening on the 5<sup>th</sup> before dying out very early on the 6<sup>th</sup>. Sioux City (Woodbury County) reported 0.01 inch while Sanborn (O'Brien County) observed 0.85 inch. The first of multiple low pressure systems began moving through Iowa during the day, bringing sporadic thunderstorm activity over Iowa's northern third. The low's attendant cold front swept across the state overnight into the 8<sup>th</sup> providing widespread and locally heavy rain in western Iowa. Over 20 stations reported an inch or more with Manning (Carroll County) observing 2.47 inches. The front continued through Iowa before exiting the eastern border before midnight. Rain totals reported at 7:00 am on the 8<sup>th</sup> highlighted several pockets of 0.50 inch and more in southern and eastern Iowa with general totals of a few tenths at other stations; Centerville (Appanoose County) and Osceola (Clarke County) both measured totals above two inches. Another disturbance brought severe thunderstorms to northwestern Iowa around midnight with scattered hail reports. Heavy rainfall was also observed in the stronger cells; a small sliver of stations from Plymouth to Carroll counties observed totals above 1.50 inches; Remsen (Plymouth County) dumped out 2.01 inches. Widespread totals in the state's western half ranged from 0.25 inch to an inch with a statewide average of 0.32 inch.

Showers and thunderstorms continued across central Iowa into the 9<sup>th</sup> as a potent low pressure system approached southwestern Iowa. Additional waves of strong and severe thunderstorms formed throughout the

evening in southeastern Iowa and then later in the night over western Iowa, persisting across much of Iowa's southern half into the late morning hours of the 10<sup>th</sup>. Rain totals from the previous 48 hours were highest in southern Iowa with local amounts of 2.00 to 4.00 inches; Chariton (Lucas County) observed 4.13 inches. Iowa's northern half saw a gradient from a few tenths of an inch to more than an inch farther south; the statewide average total was 0.91 inch. As the strong disturbance pushed east, rainfall continued through the day as storms re-fired in western Iowa, with a stronger line of storms moving into central Iowa during the evening. Stubborn showers sat over southeastern Iowa as the system slowly moved out on the morning of the 11<sup>th</sup>. As with the last several days, beneficial rains were poured out of gauges across much of western, central and southeastern Iowa, generally between 0.25 inch to 1.25 inches. Slow-moving storms in Lyon and Sioux counties brought localized totals above 2.50 inches over 24 hours. Showers continued to stream into Iowa's southeastern corner on the backside of a low pressure system with three stations in Bloomfield (Davis County) reporting totals between 1.39 inches to 1.82 inches; amounts quickly tapered off to below 0.50 inch northwest.

A broad area of thunderstorms moved into northwestern Iowa around 3:00 am on the 14<sup>th</sup> and persisted into the 15<sup>th</sup> with moderate rainfall over Iowa's southern one-third. Rain totals for the event were heaviest in central and eastern Iowa where pockets of one to three inches were reported with over 80 National Weather Service co-op stations measuring an inch or more; Maxwell (Story County) observed 4.40 inches while the statewide average was 1.11 inches. The next rain event occurred late on the 23<sup>rd</sup> as cloud cover increased across northwestern Iowa in advance of a low pressure system moving through the Dakotas into Minnesota. The southern flank of the system brought showers through northern Iowa into the morning of the 24<sup>th</sup> before dissipating in northeastern Iowa a few hours later. Rain totals were light with under 30 stations reporting measurable amounts; Sibley (Osceola) observed 0.24 inch while Everly (Clay County) only reported 0.01 inch.

Isolated thunderstorms popped up in extreme northeastern Iowa through the early afternoon hours of the 27<sup>th</sup>, leaving behind at least 1.00 inch totals across Allamakee and Winneshiek counties. An additional line of strong thunderstorms pushed over the Minnesota border and skirted the Iowa-Wisconsin border into the early hours of the 28<sup>th</sup>. One storm cell turned severe with a wind gust of 63 mph observed near Aurora (Buchanan County). Another well-organized line of thunderstorms speeding south from Wisconsin pushed through the same parts of eastern Iowa. Six stations measured over two inches with a Community Collaborative Rain, Hail and Snow (CoCoRaHS) gauge in Camanche (Clinton County) measuring 2.89 inches. Rain amounts quickly tapered off to less than a few tenths of an inch farther west.

Scattered showers along a cold front remained over central and eastern Iowa into the 29<sup>th</sup> with higher totals in the southeast corner from lingering storms. With winds shifting to a northerly direction behind the front, thick smoke from western and Canadian wildfires filtered into the state, leading to an Air Quality Alert on the 30<sup>th</sup>. Moderate to heavy rain from widespread showers and thunderstorms was observed over Iowa's southwest half. More than 50 stations measured an inch or more with pockets of above 2.50 inches in southwest and south-central Iowa; Oakland (Pottawattamie County) measured 2.55 inches while Knoxville (Marion County) reported 3.60 inches. Most stations across this southwest region observed at least 0.50 inch with the statewide average at 0.74 inch. Along with heavier rainfall, there were a few reports of damage from straight-line winds and golf ball-sized hail from isolated severe storms firing after midnight into the 31<sup>st</sup>.

Monthly precipitation totals ranged from 0.70 inch near Cedar Rapids (Lynn County) to 12.90 inches in Chariton (Lucas County); both gauges are a part of the CoCoRaHS network.

Severe Weather: There were two days in which severe weather produced significant impacts across portions of Iowa. The first event occurred on the afternoon of the 9<sup>th</sup> and involved a severe-warned discrete supercell thunderstorm that fired over Webster County and raced southeast through the Des Moines (Polk County) metro area before

dissipating in south-central Iowa. The cell produced golf to tennis ball-size hail from Woodward (Dallas County) to Carlisle (Warren County), shredding tree leaves, snapping corn stalks and defoliating soybean fields along a 70-mile path; Woodward reported three-inch hailstones while an observer in Beaverdale (Polk County) collected 3.25-inch hail.

The second event developed with a broad area of thunderstorms moving into northwestern Iowa around 3:00 am on the 14<sup>th</sup>, which would turn out to be a significant weather day. The first wave of rainfall was heavy across northern and eastern Iowa, along with some strong to severe thunderstorms; these storms did not use up all of the atmospheric instability allowing a second, and much stronger, area of severe supercell thunderstorms to form in central Iowa during the afternoon. Within a stretch of four hours, several supercells produced tornadoes from Sac City (Sac County) to Canton (Jones County). Most of the tornadoes were rated EF-1 but a strong EF-3 tornado produced crop and property damage along a 10-mile stretch through Lake City (Calhoun County); wind speeds were estimated between 135-145 mph. Preliminarily, there were 26 tornadoes across Iowa, the third highest count for a day since records started in 1980. Thankfully, no injuries or fatalities were reported.

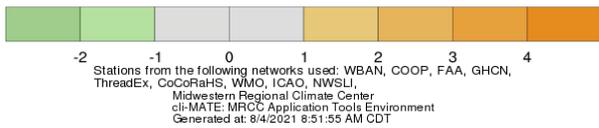
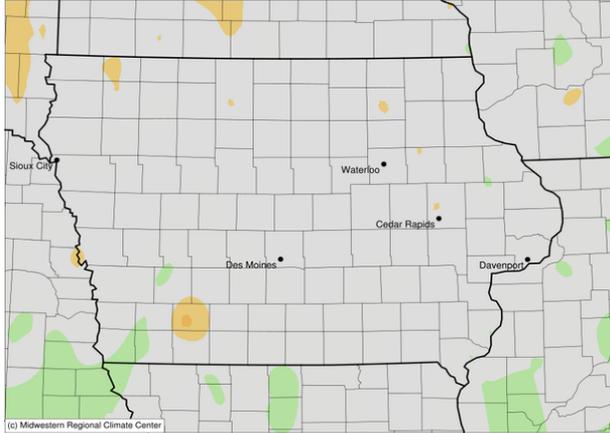
US Drought Monitor (USDM): The USDM drought depiction as of the first week of July indicated the drought categorical coverage at 16 percent D0 (Abnormal Dryness), 29 percent D1 (Moderate Drought), and 38 percent D2 Severe Drought). A welcome shift in the storm track during the second week of July brought much-needed precipitation statewide with a majority of the Iowa's National Weather Service (NWS) co-op stations measuring above-average rainfall with parts of southern Iowa measuring amounts from one to three inches above average. With these above-average totals, southwestern Iowa saw a one-category improvement in drought conditions. The map remained generally unchanged until the first week of August, as sweltering temperatures and accumulating precipitation deficits led to the introduction of two areas of D3 (Extreme Drought) in north-central to northeastern Iowa and in the northwest corner of Iowa. This represents the first D3 area in Iowa since April 6th, 2021 and widest extent of D1-D3 conditions since September 2020.

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July 2021										
WEATHER BY DISTRICTS										
DISTRICT	TEMPERATURE (F)		COOLING DEGREE DAYS				PRECIPITATION (inches)			
	July 2021		July 2021		Since Jan., 1, 2021		July 2021		Since Jan.1, 2021	
	Average	Departure*	Average	Departure*	Average	Departure*	Average	Departure*	Average	Departure*
Northwest	73.2	+0.3	254	+7	581	+132	3.80	+0.09	14.94	-3.05
North Central	72.4	-0.3	230	+2	551	+135	3.03	-1.19	14.18	-5.97
Northeast	72.5	0.0	233	+4	546	+136	3.30	-0.87	14.65	-5.70
West Central	73.7	-0.8	269	-11	600	+81	3.89	+0.01	17.95	-1.31
Central	73.6	-0.2	266	+1	601	+112	2.99	-1.35	14.13	-6.95
East Central	73.9	-0.4	274	-1	609	+93	3.54	-0.41	19.38	-1.37
Southwest	74.8	-0.9	304	-18	647	+51	4.86	+0.39	20.48	-0.27
South Central	74.5	-0.8	296	-10	621	+66	6.09	+1.61	21.28	+0.05
Southeast	74.5	-1.4	295	-24	631	+30	5.31	+0.97	25.75	+4.19
STATE	73.6	-0.5	267	-5	596	+96	4.00	-0.15	17.75	-2.53

\* Departures are computed from 1991-2020 normals. Monthly estimates are preliminary and are likely to change.  
 The weather data in this report are based upon information collected by the U. S. Dept. of Commerce, NOAA National Weather Service.

**Average Temperature (°F): Departure from 1991-2020 Normals**  
 July 01, 2021 to July 31, 2021



**Accumulated Precipitation (in)**  
 July 01, 2021 to July 31, 2021

