

# Central Indiana

## July 2021

### Climate Summary

*Tied 56<sup>th</sup> Coolest on record at Indianapolis*

*22<sup>nd</sup> Wettest on record at Indianapolis*

## Temperatures

July 2021's near-normal temperatures continued June's pattern of generally non-anomalous readings, as the month featured many days slightly above normal with a few, brief cooler periods under Canadian high pressure. No heat waves occurred per se as persistent rather humid conditions kept both highs and lows moderated...although consecutive days reaching the upper 80s were commonly seen. The overall synoptic pattern placed Indiana between the broad, upper-level ridge over the western US, and a typically troughy set-up to the east. Several modest deviations from this pattern led to the few warmer/milder periods. After the month started on a seasonal note, **July 2<sup>nd</sup>-3<sup>rd</sup>** found cooler Canadian air plunging down the upper Mississippi Valley and into central Indiana. Temperatures ranged in most places from the mid/upper 50s to only the upper 70s to near 80F, despite ample sun both days. All 1<sup>st</sup>-order airports recorded their lowest temperature of the month. The Crawfordsville 6SE COOP site (Montgomery Co.) dropped to 49F early on the **3<sup>rd</sup>**.

Very warm conditions returned on **July 5<sup>th</sup>-7<sup>th</sup>**, as a large portion of the western ridge broke down, spilling eastward into the Mid-West. Diurnal ranges near the 90/70 realm were common for most locations. The Shoals 8S COOP site (Martin Co.) hit 94F on the **6<sup>th</sup>**. Another shot of milder air entered Indiana on **July 9<sup>th</sup>-11<sup>th</sup>**, courtesy of an upper wave that cut-off from the Dakotas to the lower Missouri Valley, which provided a rather cloudy, southwest flow aloft. The New Castle 3SW COOP site's (Henry Co.) daily maximum temperature only reached the low 70s on both the **9<sup>th</sup>** and **10<sup>th</sup>**. The middle of the month saw rather mundane temperatures – both from the generally cloudy/rainy conditions seen through the **16<sup>th</sup>** (see below), and then the weakly troughy-yet-partly sunny combination that followed through the **20<sup>th</sup>**.

Late month then saw the western ridge strengthen while sliding slightly eastward toward Indiana. The resultant flat upper ridge over Indiana, with a northwest flow from southern Canada, made for several summery days that did not exceed the mid 80s in most locations. The month's most prolonged very warm/hot period then followed for most of **July 24<sup>th</sup>-29<sup>th</sup>**, as the western ridge built farther east – settling over the Heartland. Excepting brief lower dewpoints that followed a weak boundary on the **27<sup>th</sup>**, these several days were quite humid while high temperatures reached the upper 80s to low 90s. The Washington 1W COOP site (Davies Co.) had a sultry overnight low of 76F on the **26<sup>th</sup>**, while Shoals 8S rose to 93F on the **29<sup>th</sup>**. The atmosphere see-sawed yet again to end July, as back-to-back areas of Canadian surface high pressure first returned temperatures to near normal on the **30<sup>th</sup>**, before unseasonably mild readings infiltrated the region on the **31<sup>st</sup>**. The temperature was 58F and falling when the month ended at both Bloomington and Lafayette.

Site	July 2021 Average Temp	July 2021 Dep from Nml	Highest Temperature	Lowest Temperature
Indianapolis Int'l Airport	74.9	<b>-0.9</b>	91 on 26 <sup>th</sup>	56 on 3 <sup>rd</sup>
Lafayette	73.5	<b>-0.1</b>	90 on 29 <sup>th</sup>	50 on 3 <sup>rd</sup>
Muncie	75.4	<b>-0.6</b>	90 on 7 <sup>th</sup> , 25 <sup>th</sup>	56 on 3 <sup>rd</sup>
Terre Haute	75.4	<b>+0.1</b>	90 on 26 <sup>th</sup> , 27 <sup>th</sup>	55 on 3 <sup>rd</sup>
Bloomington	74.7	0.0	91 on 26 <sup>th</sup>	55 on 3 <sup>rd</sup>
Shelbyville	76.0	<b>+0.5</b>	91 on 26 <sup>th</sup> , 27 <sup>th</sup>	57 on 3 <sup>rd</sup>
Indianapolis Eagle Creek	75.8	<b>-0.1</b>	90 on 29 <sup>th</sup>	57 on 2 <sup>nd</sup>

At Indianapolis, July 2021's daily average temperatures were above normal on 11 days, at normal on 5 days, and below normal on 15 days. It tied for the 56<sup>th</sup> coolest July for the Indianapolis Area since weather records began in 1871.

# Precipitation

July 2021 was wetter than normal for most of central Indiana, although rainfall frequency was near normal. The greatest rainfall events were on the 1<sup>st</sup> and during the 8<sup>th</sup>-16<sup>th</sup>, before a drier second half of the month...although a few locally moderate/heavy rainfalls did occur between the 23<sup>rd</sup>-29<sup>th</sup>. The month started wet on the 1<sup>st</sup>, with a soaking rain through the AM hours for most locations, resulting in a storm total of 4.18" near Martinsville (Morgan Co.), and several other event totals over 3.00" along the Owen-Monroe County line and in Columbus (Bartholomew Co.). Numerous reports of **flash flooding** over roads and into low-lying areas were received from Frankfort (Clinton Co.) to the west side of Indianapolis; also, a section of Indiana route 32 washed out in eastern Fountain County.

Showers and thunderstorms brought rains of 1"+ on July 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> to parts of the region. The 7<sup>th</sup> saw several reports of 2-3" in central Tippecanoe County, with isolated 1-2" around Muncie, the Indianapolis northwest suburbs and Shoals. On the 8<sup>th</sup> an impressive 3.18" was recorded southwest of Greensburg (Decatur Co.), while 2.60" was observed near Anderson (Madison Co.), with 1-2" seen across much of the region's central counties. Minor flooding was reported in southern Madison County. For this 3-day period, most areas totaled around 1-2".

Further showers and storms fell July 10<sup>th</sup> through 13<sup>th</sup>. On the 10<sup>th</sup>, 2.97" was reported near Unionville (Monroe Co.), with 1-2" common across the southeastern half of the region. The 11<sup>th</sup> brought numerous readings near 1" across north-central counties...before the 12<sup>th</sup> saw 2.00" near Shepardsville (Vigo Co.), with several 1-2" reports elsewhere, especially from Indianapolis to Kokomo (Howard Co.). A scattering of observed rainfall of up to 1" was seen on the 13<sup>th</sup> over central and eastern counties. This 4-day period found 1-2" totals for most locales, although isolated 4-day totals over 3.50" were reported in Brown, Monroe and Hamilton Counties.

The month's heaviest rains fell on July 15<sup>th</sup> and 16<sup>th</sup>. Through dawn on the 16<sup>th</sup>, A patch of 2-2.5" of rain had fallen across Indianapolis' southern to eastern perimeter, while the highest totals were 2.75" in New Palestine (Hancock Co.) and 2.69" in Brooklyn (Morgan Co.), with 1-2" seen across most of the region. The following 24 hours saw even heavier rainfall totals: 3.92" east of Flat Rock, 3.75" in Tannersville (Jennings Co.), with 2-3" common elsewhere across the southern third of central Indiana, and several observations of 1-2" along northern counties. Reports of **flooded roads** were received on the 15<sup>th</sup> from near Flora (Carroll Co.), and on the 16<sup>th</sup> from Bloomington. Rainfall totals for this 2-day period of 2.5-4" were common along and south of the I-70 corridor.

The prolonged mid-month wet period made **river flooding** inevitable: nearly 30 river sites entered flood stage, starting late on July 16th. Most sites were only in flood between the 17th and 21st, while downriver portions of the East Fork White and White River remained in minor flood stage through the 23<sup>rd</sup> and 26th, respectively. Flooding also occurred along several non-main stem rivers and creeks, primarily across south-central and southeastern counties, with most of these sites in flood for under 24 hours. However, Amity and Edinburgh (both in Johnson Co.), Walkerville (Shelby Co.), and Rushville (Rush Co.) were in flood for about 48 hours

each. **Moderate flood stage** was reached on the East Fork White at Seymour for nearly 50 hours from the evening of the 17th to the evening of the 19th. While of noticeably shorter durations, **moderate flood** was also reached on the **17<sup>th</sup>** on Beaver Creek at Shoals and the Driftwood River southwest of Edinburg (Bartholomew Co.)...and on the **18<sup>th</sup>** on the Little Blue River at Walkerville.

Organized rains returned with relatively lighter amounts on the **23<sup>rd</sup>** and **24<sup>th</sup>**...although on the **24<sup>th</sup>**, 2.11" was measured on the south side of Terre Haute, with 1-2" across the rest of Vigo County. On the **29<sup>th</sup>**, the same storm system that spawned two tornadoes (see below), also brought an extreme rainfall observation of **6.66"** east of Flat Rock, and 1.5-2.5" in and around Columbus. Numerous **flooded roads** were reported in southern Shelby County and a **water rescue** was performed in Hope (Bartholomew Co.). Elsewhere, these pre-frontal rains had otherwise modest measurements, with only isolated 1-2" reports.

Normal July rainfall totals range from about 3.80 to almost 5.00" across central Indiana. July 2021's totals continued June 2021's pattern: encompassing near normal to anomalously high values...as most locations were 1-4" above normal. Also similar to June 2021's pattern, there was a general north-south gradient, with 7-11" common along and south of the I-70 corridor, while 5-8" totals were the rule to the north. Most anomalous were 12-15" amounts in both Columbus (Bartholomew Co.) and east of Flat Rock (Shelby Co.), as well as several 10-11" reports near the Owen-Monroe County line. Howard County once again was the region's minimum, with generally 3-5".

The overall wet month was due more to the several moderate/heavy rain events than any persistent rainy pattern. This was perhaps most exemplified at Shelbyville where 4 days recorded 1.00"+ (normal is 1 day), while all other 1<sup>st</sup>-order airports each tallied 2 such days (normal being generally 1 day). Terre Haute, Bloomington and Shelbyville reported 6, 5 and 5 days with 0.50"+, respectively (2 days more than normal at each site)...while Muncie totaled 0.10"+ on 11 days (where the normal is only 6). Indianapolis' year-to-date precipitation total, **29.32"** through July 31st, is **1.62"** above normal. Looking back at July 2020, Indianapolis' precipitation was an adequate, yet near-normal 4.90"; July 2021's sum was 143% of normal.

Site	July 2021 Precipitation	July 2021 Diff. from Normal	Wettest Day	Longest Dry Stretch
Indianapolis Intl AP	6.34	<b>+1.91</b>	2.78 on 1 <sup>st</sup>	6 days, 18-23 <sup>rd</sup>
Lafayette	4.40	<b>+0.32</b>	1.86 on 8 <sup>th</sup>	6 days, 18-23 <sup>rd</sup>
Muncie	5.25	<b>+1.15</b>	1.26 on 16 <sup>th</sup>	5 days, 2-6 <sup>th</sup> & 18-22 <sup>nd</sup>
Terre Haute	6.60	<b>+2.26</b>	1.62 on 25 <sup>th</sup>	5 days, 2-6 <sup>th</sup>
Bloomington	6.68	<b>+1.79</b>	2.32 on 16 <sup>th</sup>	7 days, 18-24 <sup>th</sup>
Shelbyville	7.38	<b>+3.51</b>	2.30 on 16 <sup>th</sup>	6 days, 18-23 <sup>rd</sup>
Indy – Eagle Creek	4.10	<b>-0.19</b>	1.57 on 1 <sup>st</sup>	6 days, 18-23 <sup>rd</sup>

July 2021 was the **22<sup>nd</sup> wettest** for the Indianapolis Area since weather records began in 1871.



# Severe Weather

July 2021's severe weather was technically confined to only four days, yet included a microburst and two weak tornadoes. Heavy rains led to flash flooding concerns on five days (see above), three of which were mutually exclusive from severe wind/tornado days. No severe hail (1.00"+) was reported in central Indiana during the month. **July 8<sup>th</sup>** featured several marginally strong-severe midday to afternoon thunderstorms, ahead of a slowly-approaching cold front. A **microburst** left wind damage along a 4-mile path between Homer and Rushville (Rush Co.). The winds significantly damaged a home's roof and side wall, destroyed or damaged several farm out buildings and trees, and blew debris 100 yards to the east. Just as the microburst diminished, the same storm continued across Rush County, braking power poles and downing trees in Rushville...before downing large tree limbs and flattening crops near New Salem. Later in the afternoon a strong storm dropped penny-sized hail (0.75") near North Vernon (Jennings Co.).

July **15<sup>th</sup>**s scattered late day thunderstorms damaged a barn roof in Bringhurst (Carroll Co.) and downed trees in Quincy (Owen Co.), before the storm's leading edge intensified while approaching the Indianapolis area. Trees were downed both near Avon and in Plainfield (Hendricks Co.), with tree branches downed in Trafalgar (Johnson Co.). Then on the **16<sup>th</sup>**, several rounds of late day showers and storms included a few strong cells, however, the only damage report was of small limbs downed by winds in Odon (Davies Co.).

On the **29<sup>th</sup>**, hot and humid conditions combined with a cold front approaching from the north to produce several strong to severe storms in the early evening. Shelby County took the brunt of the more severe weather for not the first time this summer, including **two EF-1 tornadoes**. The first tracked 2.5 miles from southeast of Shelbyville to west of Waldron with estimated peak winds of 90 mph, as it damaged support beams on a porch, knocked down a masonry wall, snapped an antenna pole, and at times caused widespread tree damage. The second EF-1 tracked for 0.7 miles to the south of Waldron with estimated peak winds of 90 mph, as it made a narrow but intense swath of tree damage and knocked over several grave stones in the Van Pelt Cemetery. These events brought central Indiana's 2021 tornado tally to 4. Other, non-tornadic, damage in Shelby County included a partially damaged roof in Shelbyville and downed trees on the east side of Waldron. A separate storm downed a small tree just northeast of Vincennes (Knox Co.).

*For info on severe weather in other areas during July, visit the Storm Prediction Center "Severe Weather Event Summaries" website at [spc.noaa.gov/climo/online](https://spc.noaa.gov/climo/online)*

## Miscellaneous

The month's maximum wind gust at the Indianapolis International Airport was 46 mph (from the west-northwest) on the 15<sup>th</sup>, with none of the other 1<sup>st</sup>-order airports recording any gusts of 45 mph or greater.

Fog was reported at Indianapolis on 14 days during the month, with no dense fog (visibility  $\leq 1/4$  mile). Fog was, however, quite frequent at most 1<sup>st</sup>-order airports, occurring on at least 24 days at Bloomington, Lafayette, Shelbyville and Terre Haute. **Dense fog** was most frequent at Lafayette (8 days), while most common on the 5<sup>th</sup>, 15<sup>th</sup>, 16<sup>th</sup>, 26<sup>th</sup> and 28<sup>th</sup> (at 2 sites on each of these days).

Thunder was reported on 10 days at Indianapolis, and was generally common elsewhere -- occurring on 8 to 10 days at all other 1<sup>st</sup>-order sites except Lafayette (only 5 days).

Haze from **smoke** was unusually common over central Indiana, due to upstream forest fires over both the northwestern US and near the southern Saskatchewan-Manitoba border. While at least optically-thin haze was occasionally found over much of the region from the 4<sup>th</sup> onward...it was not until surface high pressure tracked from south-central Canada into Indiana on the 21<sup>st</sup> that widespread smoke then reached the surface. Visibilities dropped to a persistent 4 to 6 miles during the day and much of the evening. Smoke-based haze continued to occasionally reduce visibility through the remainder of the month, especially when under the subsidence of areas of high pressure. Visibility as low as **2 miles** was reported in times of calm winds near Vincennes (Knox Co.) on the 21<sup>st</sup>, as well as at Indianapolis Eagle Creek early in the evening on the 23<sup>rd</sup>.

## August 2021 Outlook

The official outlook for August 2021 from the Climate Prediction Center indicates an equal chance of above, below or near normal temperatures for central Indiana. The normal August temperature for Indianapolis is 74.7 degrees.

The outlook also indicates a greater chance of above normal precipitation across the region. The normal August precipitation at Indianapolis is 3.20".

*Data prepared by the Indianapolis Weather Forecast Office's State Climate Team*

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