

# Central Indiana September 2021 Climate Summary

*30<sup>th</sup> Warmest on record at Indianapolis*

*23<sup>rd</sup> Wettest on record at Indianapolis*

## Temperatures

September 2021's very warm temperatures averaged about 3 degrees above normal across central Indiana, which included generally near-normal readings for the first 11 days, several ~3-day periods of unseasonable warmth between the middle and very end of the month, and several days of below normal temperatures that started on the 22<sup>nd</sup>. Afternoon highs in the mid-80s to low 90s were common on the 11th-14th, 17th-19th, and 27th-30th. Perhaps surprisingly, this was only the 5th warmest September of the last decade at Indianapolis, due to several anomalous recent Septembers between the record warmest (2019) and two others in the all-time top-15 warmest (2018, 2016). Monthly maximums were reached on the 14th, 18th, and 19th across the region, when most locations reached the upper 80s to low 90s. The coolest morning for nearly all sites was observed on September 24th as widespread low to mid 40s were found across the region.

After a hot and humid end to August, September started near to slightly below normal as a seasonably strong mass of Canadian high pressure passed from the Great Lakes to the upper Ohio Valley. Most locations dropped into the 50s on the mornings of both the 2<sup>nd</sup> and 3<sup>rd</sup>, with the lowest mark of **51F** at New Castle 3 SW (Henry Co.) both mornings. On the 3<sup>rd</sup>, Indianapolis Int'l Airport's high of 78F was only the second sub-80F max in 49 days.

On the 6<sup>th</sup>, readings at most locales saw a diurnal spread of 25F or greater, with the Beck Agricultural Center northwest of West Lafayette (Tippecanoe Co.) climbing from 55F to 87F (a 32 degree rise). Most sites reached the mid to upper 80s on both the 6<sup>th</sup> and 7<sup>th</sup>, with Shoals 8 S (Martin Co.) peaking at 89F and 88F, respectively. Following the next cold frontal passage early on the 8<sup>th</sup>, high pressure and dry northwesterly flow aloft promoted generally seasonable temps through the morning of the 11<sup>th</sup>. Another transition then occurred during the day of the

**11<sup>th</sup>** as robust south-southwesterly breezes again boosted readings to very warm levels, with Rockville (Parke Co.) climbing from 60F to 89F (a 29 degree rise).

On the **12<sup>th</sup>-14<sup>th</sup>**, all 1st-order airports averaged at least 10 degrees above normal courtesy of persistent south-southwesterly winds. The **14<sup>th</sup>** was the most anomalous per lows near 70F at most locations ... with afternoon maximums as high as 92F at the Southwest Purdue AG Center northeast of Vincennes (Knox Co.). The **15<sup>th</sup>-16<sup>th</sup>** included a brief respite to more seasonable readings as high pressure crossed the southern Great Lakes. The **17<sup>th</sup>-19<sup>th</sup>** then saw upper ridging build over the Mid-West, with the generally southerly flow again boosting afternoon highs near 90F, while the rather humid air mass held morning lows in the 60s. The **18<sup>th</sup>** was the hottest day of the month for most sites, with over a dozen COOP stations and most 1st-order airports reaching the low 90's, including **93F** at Shelbyville Municipal Airport. Tipton 5 SW (Tipton Co.) made it into the 90s all three days, including 92F on the **18<sup>th</sup>** and **19<sup>th</sup>**. 90+ marks were hit on two of the three days at 5 other stations, mainly along the Wabash Valley.

Late September featured a regime change to **noticeably cooler fall-like weather** following the passage of both a seasonably strong cold front on the **21<sup>st</sup>**...and the system's associated amplified trough, which cut-off over southern Indiana on the **22<sup>nd</sup>** before twisting northward into Canada. This cold core passing over Indiana, combined with cloudy and rainy conditions, held the **22<sup>nd</sup>**'s high temperatures 10 to 20 degrees below normal at most locations; the lowest reading was 53F at Kokomo 3 WSW (Howard Co.). Broad high pressure quickly followed the departing cut-off on the **23<sup>rd</sup>**, maintaining below normal temperatures while bringing the first 40s to most of the region since late May. All first-order airports recorded their first 50F or lower temperature on the evening of the **23<sup>rd</sup>**, which at Indianapolis tied for the 15<sup>th</sup> latest, or 90th percentile; the record latest being October 5<sup>th</sup> (2019). The **24<sup>th</sup>** featured the month's coldest morning for essentially all locations, as low to mid 40s prevailed. **40F** was hit at both Rockville and New Castle 3 SW. A reinforcing cold frontal passage early on the **25<sup>th</sup>** kept temperatures near to slightly below normal through the morning of the **26<sup>th</sup>**. The colder portions of the region recorded lows in the 40s for four consecutive days, **23<sup>rd</sup>-26<sup>th</sup>**, including Bloomington and Terre Haute.

The **26<sup>th</sup>** featured the most pronounced transition of the month, as south-southwesterly breezes that gusted as high as 28 mph boosted a 30-35 degree warm up for most sites, with Terre Haute jumping from 43F to 79F (a 36 degree rise). This ushered in consistently warm conditions that lasted through the end of the month, as most sites averaged ~10 degrees above normal over the **27<sup>th</sup>-30<sup>th</sup>**. The 80s were common across central Indiana for the final four days as ridging prevailed over Indiana, with a few 90F+ observations with Lafayette and Perrysville 4 WNW (Vermillion Co.) both hitting 90F on **9/27**, to Shoals 8 S reaching 91F on **9/28**.

September 2021's above normal temperatures continued the trend from August 2021's warmth, but were in contrast to the near-normal readings observed in September 2020.

Site	September 2021 Average Temp	September 2021 Dep from Nml	Highest Temperature	Lowest Temperature
Indianapolis Int'l Airport	70.2	<b>+2.4</b>	89 on 18 <sup>th</sup> , 19 <sup>th</sup>	46 on 24 <sup>th</sup> , 26 <sup>th</sup>
Lafayette (*)	69.6	<b>+4.1</b>	91 on 18 <sup>th</sup> , 19 <sup>th</sup>	42 on 24 <sup>th</sup>
Muncie	70.1	<b>+2.9</b>	91 on 18 <sup>th</sup>	49 on 24 <sup>th</sup>
Terre Haute	70.1	<b>+3.5</b>	91 on 14 <sup>th</sup> , 18 <sup>th</sup>	42 on 24 <sup>th</sup>
Bloomington	69.5	<b>+3.0</b>	89 on 14 <sup>th</sup> , 18 <sup>th</sup>	44 on 24 <sup>th</sup>
Shelbyville	70.5	<b>+3.0</b>	93 on 18 <sup>th</sup>	45 on 24 <sup>th</sup>
Indianapolis Eagle Creek	70.8	<b>+3.2</b>	91 on 18 <sup>th</sup>	46 on 24 <sup>th</sup>

(\*) – Lafayette's data is missing September 1's minimum temperature

At Indianapolis, September 2021's daily average temperatures were above normal on 18 days and below normal on 10 days. It was the **30<sup>th</sup> warmest** September for the Indianapolis Area since weather records began in 1871, placing it in the 80<sup>th</sup> percentile.

# Precipitation

Outside of the winter, September is normally central Indiana's driest month, with the 2.50" to 3.60" normally seen by most locations, in stark contrast to the early summer peak (normally ~5.00" in June). 2021, however, contrasted this climatological pattern, with most of the region totaling a much-needed 3.00-7.00", including 5.25" at Indianapolis international Airport, which was 167% of normal.

The Labor Day weekend began with a soaking rain on the 4<sup>th</sup> courtesy of a wave riding along a weak cold front, as most locations picked up 0.50-1.00". A band of **1.00-2.00"** totals was found along and north of the I-70 corridor, with greatest reports of **2.54"** near Perrysville (Vermillion Co.), **2.11"** in Cumberland (Hancock Co.) and **2.00"** near Winchester (Randolph Co.). On the night of the 7<sup>th</sup>-8<sup>th</sup>, a wide line of thunderstorms brought generally light rainfall amounts, except for far northwestern counties where a second line of storms crossed before dissipating, bringing **1.21"** to Pence (Warren Co.).

Widespread showers and storms steadily crossed the region late on the 14<sup>th</sup> through the morning of the 15<sup>th</sup>, bringing isolated **1.00-3.00"** rainfall totals. Greatest reports included **2.79"** at the Muncie wastewater treatment plant, **2.51"** south of Shoals (Martin Co.), and **1.87"** in Greenwood (Johnson Co.).

The 19<sup>th</sup>-23<sup>rd</sup> brought a staunch pattern change of several rainy days from both a slowly-passing cold front during the day of the 21<sup>st</sup> ... and the system's subsequent upper trough cutting off to a stacked low on the 22<sup>nd</sup>, while sliding northward along the Indiana-Ohio border. Several rounds of showers and isolated thunderstorms, enhanced by Hurricane Nicolas' remnant moisture, crossed the region from the evening of the 19<sup>th</sup> through pre-dawn on the 20<sup>th</sup>, with greatest rains along an axis from **1.56"** in Ellettsville (Monroe Co.) to **1.99"** east of Shoals (Martin Co.). Welcomed soaking rains then continued into the daytime on the 20<sup>th</sup> south and east of Indianapolis, before isolated afternoon cells popped later across the rest of the region. These additional 1-day rains included several patches of **1.00-2.00"** south/east of the I-70/I-69 corridors, with the greatest observation totaling **2.19"** in Columbus (Bartholomew Co.). Most locations saw about a 12 hour lull in rain late on the 20<sup>th</sup> / early on the 21<sup>st</sup>, but not before widespread 2-day totals of **1.00-2.00"** had fallen across south central and southeastern counties, with around **2.50"** in the Columbus area, and **3.06"** reported from Williams 3 SW (Martin Co.) ... while only 0.25-0.50" was recorded at most locations north of I-70.

Part 2 of the extended rainy period started as the cold front slowly crossed the region from west to east on the 21<sup>st</sup>, although this produced only isolated rains, west of I-69, in the AM hours ... before scattered rain developed behind the front, in the evening, over the entire region. Generally widespread rain continued for the next 24 hours as the upper low traversed the southern and then eastern periphery of the region, while becoming stacked and cut-off from the main jet stream. Rain tapered off from southwest to northeast during the evening of the 22<sup>nd</sup>, although occasional light showers then lingered across far northern and northeastern zones through midday on the 23<sup>rd</sup>. Rainfall totals for this post-frontal 2-day period ranged from just over **1.00"** along the Wabash Valley to **2.00"+** for most central and eastern zones. A **3.00-**

**4.00"** bull's-eye extended from Bloomington to Columbus, and northward across eastern portions of the Indianapolis metro, to northern Hamilton County, with maximum reports of **4.25"** at New Palestine (Hancock Co.) and **4.18"** in Franklin (Johnson Co.).

Overall 4-day precipitation totals for the **19<sup>th</sup>-23<sup>rd</sup>** were **2.00-4.00"** for most locations, while a **5.00"+** peak was measured over the counties within the **21<sup>st</sup>-22<sup>nd</sup>'s** maximum, which were south of I-70. **5.87"** at Williams 3 SW was the greatest total, while **5.61"** was measured at Amity (Johnson Co.). The west-east gradient in overall rain totals was pronounced across the I-69 corridor, and especially Marion County - from **2.94"** near Eagle Creek Airpark to nearly **5.00"** from Southport to Cumberland. ... The soaking rains of the **22<sup>nd</sup>** brought central Indiana's first concerns of river and stream flooding since the third week of July, although rather dry antecedent soils greatly mitigated this threat. Several creeks approached bankfull conditions. Youngs Creek at Amity reached **minor flood** stage for over 36 hours, from early evening on the **22<sup>nd</sup>** through dawn on the **24<sup>th</sup>**, cresting just below moderate flood. **Minor flooding** also briefly occurred at both the North Salt Creek at Nashville (Brown Co.) and Sugar Creek near Edinburgh (Johnson Co.), on the evenings of the **22<sup>nd</sup>** and **23<sup>rd</sup>**, respectively. Several other sites peaked just below flood stage throughout the **23<sup>rd</sup>**, mainly in the vicinity of the East Fork White River, and from Marion County into all northeastern counties.

A drier, northwesterly upper-level flow then prevailed for the remainder of the month, with only light rainfall from showers accompanying a frontal passage early on the **25<sup>th</sup>** ... and locally, briefly moderate showers, during the evening of the **27<sup>th</sup>** to very early on the **28<sup>th</sup>**, also bringing light rains immediately south and east of Indianapolis.

September 2021's near to well above normal precipitation reversed August 2021's overall dry trend. These ample rains boosted Indianapolis' year-to-date total to **36.56"**, **2.52"** above normal. September 2021's wet trend was in sharp contrast to September 2020, when Indianapolis' 0.12" total made for the driest September on record, and tied for the 4<sup>th</sup> driest month since records began in 1871.

Site	September 2021 Precipitation	September 2021 Diff. from Normal	Wettest Day	Longest Dry Stretch
Indianapolis Intl AP	5.25	<b>+2.11</b>	2.07 on 22 <sup>nd</sup>	6 days, 8 <sup>th</sup> -13 <sup>th</sup>
Lafayette	2.75	+0.16	0.87 on 22 <sup>nd</sup>	6 days, 8 <sup>th</sup> -13 <sup>th</sup>
Muncie	5.17	<b>+2.08</b>	2.06 on 22 <sup>nd</sup>	6 days, 8 <sup>th</sup> -13 <sup>th</sup>
Terre Haute	2.95	+0.02	0.91 on 22 <sup>nd</sup>	5 days, 26 <sup>th</sup> -30 <sup>th</sup>
Bloomington	4.83	<b>+1.23</b>	1.39 on 22 <sup>nd</sup>	6 days, 9 <sup>th</sup> -14 <sup>th</sup>
Shelbyville	5.05	<b>+1.91</b>	2.30 on 22 <sup>nd</sup>	6 days, 8 <sup>th</sup> -13 <sup>th</sup>
Indy – Eagle Creek (*)	1.28INC	<b>M</b>	M on 22 <sup>nd</sup>	6 days, 8 <sup>th</sup> -13 <sup>th</sup>

(\*) – Indianapolis Eagle Creek is missing September 20-22 precipitation data

September 2021 was the **23<sup>rd</sup> wettest** for the Indianapolis Area since weather records began in 1871.



# Severe Weather

September 2021's thunderstorms were sporadic with only two noteworthy episodes. On the evening to early morning of the **7<sup>th</sup>-8<sup>th</sup>**, an approaching cold front brought widespread thunderstorms with a few embedded, briefly strong cells.

On the **14<sup>th</sup>**, a very warm and rather humid air mass combined with an approaching cold front to set off numerous afternoon/evening thunderstorms. A couple cells were marginally severe in far northeastern counties, with reports of a downed tree and power lines, and shingles blown off a house, in and to the south of Muncie ... as well as a tree downed to the east of Farmland (Randolph Co.).

*For info on severe weather in other areas during September, 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 40 mph (from the northwest) on the **22<sup>nd</sup>**. Greater peak wind gusts at other 1<sup>st</sup>-order airports included 43 mph at Muncie (from the northwest) on the **14<sup>th</sup>**, and 41 mph at Lafayette (from the north) on the **7<sup>th</sup>**.

Fog occurred at Indianapolis on 8 days, with no dense fog observed. All 1<sup>st</sup>-order airports outside of Marion County saw fog more often, on 17 days at both Bloomington and Terre Haute and on 14 days at Shelbyville. Bloomington saw fog every day during the **15<sup>th</sup>-22<sup>nd</sup>**, while all sites observed fog during the damp **20<sup>th</sup>-22<sup>nd</sup>**. Dense fog occurred at Terre Haute, Bloomington and Lafayette on 4, 3, and 2 days, respectively.

Thunder was reported on 5 days at Bloomington and Shelbyville, 3 days at Indianapolis, and 2 days or less elsewhere ... with all sites reporting thunder on the **14<sup>th</sup>**.

## October 2021 Outlook

The official outlook for October 2021 from the Climate Prediction Center indicates above normal temperatures are likely for central Indiana. The normal October temperature for Indianapolis is 55.5 degrees.

The outlook also indicates equal chances of above, below or near normal precipitation for central and northeastern counties, with a slightly greater chance of above normal precipitation southwest of the I-65 corridor. The normal October precipitation at Indianapolis is 3.22".

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

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