Fall 2023 Review

of Weather Conditions Experienced In Central Indiana

***17th Warmest on record at Indianapolis** (Tied)*

****7th Driest on record at Indianapolis*** *(Tied)*

Temperatures

SEPTEMBER 2023

September 2023's milder than normal start to fall contrasted the year's near to slightly below normal summer while continuing the recent trend of warmer than normal Septembers (now 8 of the last 9). The month's variable, yet seldom amplified, pattern ranged from a broad, warm upper ridge during the early month, a couple passing troughs and otherwise zonal pattern through the cooler mid-month, and finally the southern portions of a disorganized blocking-ridge pattern that attempted to set-up over interior North America through much of September's latter half. Intensifying drought conditions promoted broad diurnal ranges, with most 1st-order airports rising 30 or more degrees on seven days. Stations recorded lowest maximums across seven separate days, indicative of the overall variable large-scale pattern.

September started above normal with very warm to marginally hot afternoons on the **2nd**-**5th**, with warmer mornings following each day. Lower humidity allowed a greater diurnal spread on the **2nd**, with most sites exhibiting a 30+ degree increase, with **90F** reached across the region's far southwest as well as the Columbus (Bartholomew Co.) and North Vernon 2 ESE (Jennings Co.) COOP stations. The **3rd** brought readings as high as **91F** at the Shoals 8 S (Martin Co.), Tipton 5 SW (Tipton Co.), and Vincennes 5 NE (Knox Co.) COOP stations, with Tipton 5 SW leading the region through further moderation – peaking at **94F** and **95F** on the **4th** and **5th**, respectively. Highest morning lows ranged from 64F at Indianapolis on the **2nd**, to Muncie's 72F and Eagle Creek Airpark's 71F on the **3rd**, and 69F at Muncie on the **4th**; warmest mornings followed Muncie's lead of 74F on the **5th** and 73F on the **6th**, with many western sites only dropping to the low 70s on the **5th**. Indianapolis' recorded 88F, 89F, 90F, and 90F again during the **2nd**-**5th**, with daily lows of 69F, 68F, and 72F over the **3rd**-**5th**.

The **7th**-**12th** followed with overall near normal readings, although with modest diurnal spreads through the **7th**-**9th**. The **7th** saw the steadiest temperatures as most stations rose only 10 degrees or less, with Bloomington and the Oolitic Purdue Ex Farm (Lawrence Co.) COOP station both only gaining 6 degrees to a high of 72F; on the **8th** Terre Haute climbed only 12 degrees

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The **11th** was a warmer day with **86F** reported at Shoals 8S, Tipton 5 SW, and Vincennes 5 NE, while Indianapolis peaked at 82F.

September's mid-month readings were slightly below normal, consistently ranging from lows around 50F to highs in the 70s. On the **13th**, several western and north-central COOP stations recorded their coolest morning of the month, including **42F** at West Lafayette 6 NW (Tippecanoe Co.) and 45F at Frankfort Disposal (Clinton Co.); same was the case early on the **14th** for several northern sites, with Tipton 5 SW and the Crawfordsville 6 SE (Montgomery Co.) COOP station both touching **42F**; Indianapolis dropped to 50F and 52F, respectively. Lowest maximums for Marion County were observed on the **16th**, with 70F at Castleton 2 S and 72F at Indianapolis. A few more sites observed their lowest high on the **17th**, with 69F at Lafayette. The month's coolest 24-hr period followed, from several central and southern locations reporting their lowest maximum on the **18th**, with 70F at Frankfort Disposal and 71F at Rushville (Rush Co.), to the coolest morning for almost half of central Indiana's stations on the **19th** when the New Castle 3 SW (Henry Co.) and North Vernon 2 ESE COOP stations dropped to **43F** and 44F, respectively. The **19th** was then a day of transition, with most locations recovering 30-35 degrees and an impressive +39 spread at Tipton 5 SW (from 43F to 82F).

September's final 11 days were persistently warm as a more-humid flow held most mornings to around 60F, while generally boosting afternoons to near 80F. Warmer conditions not seen since the month's first week did occur on the **20th**, **22nd**, **25th**, **26th**, and **30th**. The **20th** saw mid-80s at several western sites, including the Shakamak State Park (Sullivan Co.) COOP station; **86F** was recorded on the **22nd** at most 1st-order airports as well as the Martinsville 2 SW (Morgan Co.) and Seymour 1 WSW (Jackson Co.) COOP stations; Bloomington reached 86F again on the **25th** while Vincennes 5 NE peaked at **89F**; while the **26th** found the Washington 1 W (Daviess Co.) COOP station also reaching **89F** mark while Terre Haute recorded 87F; and the **30th** was the warmest of the late-month days at Frankfort Disposal and Lafayette 8 S – 82F and 83F, respectively; Indianapolis' maximums for these five **selected dates** were 83F, 83F, 84F, 81F, and 83F, and all amid a 7-day streak of 80F+. Warmer mornings on the **21st** and **27th**, with 64F and 63F, respectively, at Indianapolis, were bisected by a cooler start on the **24th** when most locations dropped to around 50F, except for **43F** at the Kokomo 3 WSW (Howard Co.) COOP site. Greater diurnal changes were observed on the **20th** (as great as +38 degrees at both Martinsville 2 SW and Tipton 5 SW), and the **24th** (the overall greatest of the month, with +38 degrees at the Perrysville 4 WNW (Vermillion Co.) COOP station and Terre Haute, and +29 at Indianapolis); before clouds and more humid and rainy conditions that allowed only a 13 degree change at Muncie on the **27th** and Indianapolis on the **28th**.

September 2023's temperatures displayed a prevailing, yet non-anomalous warmer pattern through the early and late month, which more than offset a cooler and slightly below average mid-month. Deviations above normal at 1st-order airports ranged from modest (+0.5F) at Muncie to more consistent warmth (+2.0 to +2.5) from Lafayette to Indianapolis and Shelbyville. Intensifying drought conditions promoted several days with large temperature spreads, greatest on the **24th** at most locales, and led by Terre Haute which rose 35+ degrees on 3 occasions. Several days reached the 80s (but not quite 90s), resuming the trend that had been

seen across the region through much of the spring and early summer; even though a majority of stations hit 90F+ in early September, only a few spots reached this level on more than 3 days. Year-to-date 90F-day days at 1st-order sites are now generally near to slightly below normal, ranging from 12 at Eagle Creek Airpark to 23 at Terre Haute, yet only 15 hot days at Indianapolis and Bloomington is only 75% of normal for both stations; most airports have observed the fewest 90+ days through September since 2017, with the fewest since 2015 at both Bloomington and Eagle Creek Airpark. Indianapolis' average temperature through 2023's first 9 months is the 2nd highest since 2012, yet the last 6 months (that is, omitting this year's anomalously mild January-February) are the 2nd coolest since 2015.

At Indianapolis, September 2023's daily average temperatures were above normal on 18 days, below normal on 11 days and at normal on 1 days; however, 19 days were within 2 degrees of normal. September 2023 tied for the Indianapolis Area's 33rd warmest September since weather records began in 1871, placing it in the 78th percentile.

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October 2023 continued September's ~2.0-degree above normal trend for the first such tandem so warm relative to normal since the anomalously mild January-February 2023. Outside of an overall near-normal period during the **11th-23rd** it was a month of stronger extremes, with 11 other days at least 10 degrees above or below normal at Indianapolis. While several of these warmer/cooler trends lasted generally ~4 days each (warmer **1st-4th**, **24th-27th**; cooler **7th-11th**, **29th-31st**), warm anomalies were overall twice as deviant from normal than coolest days, guiding the month's overall trend. Widespread **moderate drought** conditions continuing through most of the month promoted eight days with diurnal ranges of ~30 degrees or greater for most locations, mainly during the 1st and 3rd week's warmer periods.

October started with unseasonable warmth continuing through the **4th**, while moderating mornings lasted into the **5th**; despite low to moderate humidity, mainly light southeasterly winds and plentiful sunshine promoted impressive diurnal spreads of ~30-35 degrees across much of the region, between lows trending from the 50s to low 60s and highs in the mid to upper 80s. Maximums, amid overall subtle variation, were generally highest on the **2nd** and **3rd**; with readings led on the **1st** by **87F** at Lafayette and the Perrysville 4 WNW (Vermillion Co.) and Vincennes 5 NE (Knox Co.) COOP sites, on the **2nd** by **90F** at the Tipton 5 SW (Tipton Co.) COOP station, on the **3rd** by **90F** at the three aforementioned COOP sites as well as the Shoals 8 S (Martin Co.) COOP station, and on the **4th** by **89F** at Vincennes 5 NE; Indianapolis meanwhile peaked ~5 degrees shy of record highs, with 84F, 85F, 86F, and 85F, respectively. Highest daily minimums were mainly observed on the **4th**, with readings as high as 65F at the Vincennes 5 NE, Lafayette 8 S (Tippecanoe Co.) and Shakamak State Park (Sullivan Co.) COOP sites, while Indianapolis dropped to 63F; although the **5th** brought a slightly milder morning to most locations before the calendar day's low late in the evening. Terre Haute observed the greatest diurnal variations through the **1st-3rd**: +35, +36, and +37 degrees, respectively, while Muncie climbed 35 degrees on the **2nd**.

A cold front crossed Indiana late on the **5th** ahead of much colder Canadian high pressure that

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plunged into the central United States on the **6th**, before bringing quite cool conditions to the region during the **7th**-**10th** and into the morning of the **11th**. While several northern-tier locations had measured their first heating degree-days (daily average temperature under 65F) of the season through the final days of September, Indianapolis followed suit on the **6th**. The greatest ~50-hour downward temperature trends were from the afternoon of the **4th** to very early on the **7th**: dropping 43 degrees at Muncie and 42 degrees at the Rockville (Parke Co.) COOP station. Highs in the upper 50s to mid-60s then prevailed while mornings brought the first 30s and areas of frost across the region; daytime readings were lowest on the **8th** with maximum temperatures as low as 53F at both the Frankfort Disposal (Clinton Co.) and Carmel 3 E (Hamilton Co.) COOP stations, while Indianapolis, Shelbyville and Eagle Creek Airpark recorded their coldest daytime of the month's first four weeks, only reaching 55F, 57F and 54F, respectively; coldest mornings were generally on the **10th** and (especially the) **11th** as isolated first-freezing readings occurred at Lafayette (**31F** both mornings), with 33F also reported on the **10th** at Terre Haute and the Rockville and North Vernon 2 ESE (Jennings Co.) COOP stations, before Rockville followed with **32F** on the **11th** when the Perrysville 4 WNW and New Castle 3 SW (Henry Co.) COOP sites dropped to 33F; Indianapolis meanwhile observed 38F and 39F, respectively.

The synoptic set-up between a deep cut-off trough near the Ontario-Quebec border and surface high pressure over both the Upper Midwest and Gulf of Mexico coast promoted low relative humidity and large diurnal variations on the **10th**-**12th** that moderated Indiana back to near-normal readings. On the **10th**, Lafayette and Terre Haute both led the way, climbing +33 degrees into the mid-60s; the **11th**'s increase was most pronounced with the same two airports boosted +40 degrees, with several other noteworthy spreads -- +38 at Rockville, +36 at Bloomington, and +35 at the Washington 1 W (Daviess Co.) COOP station, with most sites reaching the low to mid-70s; warmth then plateaued in mainly the upper 70s to low 80s on the **12th** following diurnal variations as great as +35 at Bloomington and +34 at Terre Haute; Indianapolis saw respective daily spreads of +26, +31, and +27, resulting in corresponding highs of 64F, 70F, and 78F. The region's highest temperature on the **11th** was **76F** at Vincennes 5 NE, before the **12th** was led by **82F** at Perrysville 4 WNW and Shoals 8 S, while 81F was observed at several far southern sites and the Columbus (Bartholomew Co.) COOP station.

A storm system crossed the Midwest on the night of the **13th**, before northerly winds around approaching high pressure brought increasingly cooler days over the **14th**-**15th**, with 1-day downward trends in temperatures of –18 degrees at Muncie and –17 degrees at North Vernon 2 ESE. Overall seasonably cool temperatures were the rule during the **14th**-**23rd** under a combination of passing upper troughs and Canadian surface high pressure. At times cooler weather was led on the **15th**-**16th** by daytimes only reaching the 50s, and over the **21st**-**23rd** by mornings in mainly the 30s to low 40s. The lowest maximum temperatures of October's first four weeks were observed on the **15th** at Farmland 5 NNW (53F) and Bloomington and Muncie (both 57F), and on the **16th** at several northern and east-central locations who all reported 54F, as well as Lafayette (55F) and Terre Haute (57F). The rainy **19th** featured the lowest daily temperature range of the month, with most 1st-order airports only changing 5 degrees,

including Indianapolis' spread from 52F to 57F. Coldest mornings were then led by New Castle 3 SW, from **34F** on both the **21st** and **22nd**, to the station's first freeze (**30F**) on the **23rd**; with other first freezes on the **23rd** at the Martinsville 2 SW (Morgan Co.) COOP station (31F) and Muncie and Columbus (both 32F). Greater diurnal spreads also returned for the **21st** … **23rd** … and **24th**, led by +37 at Terre Haute … +38 at Terre Haute, Shelbyville and Washington 1 W … and +34 at Bloomington and Shelbyville, respectively; Indianapolis' greatest daily increase of the month was +33 degrees on the **21st**, from 40F to 73F. The **24th**'s strong moderation was a pattern transition, with much of the region boosted from the upper 40s to upper 70s, including **82F** at both Muncie and Tipton 5 SW.

The **24th**-**27th** brought anomalous warmth led by very mild mornings that reached record levels on the **27th**. After the very warm **24th**, high temperatures retreated slightly through the 70s, yet rebounded again for the **27th** with **81F** at Shoals 8 S, 80F at several southwestern sites, and 77F at Indianapolis. Morning lows were the bigger story amid increasing humidity, with low 60s (more indicative of early September) common on the **25th** and **26th**, and readings as high as 64F on the **25th** at both Muncie and the Farmersburg TV-2 (Sullivan Co.) COOP station, while Indianapolis only dropped to 61F. The **27th**'s morning minimums in the low to mid-60s were as high as 66F at Muncie and 65F at Eagle Creek Airpark, Shelbyville, Rockville, and Shoals 8 S; Indianapolis' low of **64F**, a record (old 62F, 1991) was the only minimum in the 153-year record between October 26 and March 22 to surpass 63F. A strong, yet somewhat prolonged, transition to near-record cold began with a cold frontal passage during the **27th** overnight, with calendar-day minimums occurring late in the evening across western counties, to as low as 51F at Lafayette.

Late October's extremes shifted to anomalous cold through the month's final days as the eastern extents of a broad polar air mass steadily built into Indiana over the **28th**-**30th**, before a small yet potent wave crossed the northern Midwest on the **31st** ahead of a reinforcement of near-record cold. Highs trended from the 60s to near 70F during the transitional **28th** to mainly low 50s on the **29th**, and a decreasing trend through the 40s over the **30th**-**31st**; greatest drops in consecutive highs were across the **28th**-**29th** into the 50s, and as great as -24 and -23 degrees at Columbus and Rushville, respectively, while Indianapolis observed a corresponding -18 degree trend. October's coldest daytimes then closed out the month, with the **30th** only bringing 44F to several stations between Lafayette and Indianapolis, including the Jamestown 2 E (Boone Co.) COOP station, before maximums on the **31st** as low as 37F at both the Crawfordsville 6 SE (Montgomery Co.) COOP station and Lafayette 8 S, while Indianapolis reached a respective 46F and 41F. Meanwhile, daily minimum readings displayed two distinct ~15 degree downward steps: across the **27th**-**28th** with the initial frontal zone (with a change as great as -26 degrees at Rockville down to a more seasonable 39F), and then through the **29th**-**30th** as the center of the air mass built into the region (with a change as great as -20 degrees at Bloomington, down to 28F). First freezing temperatures had been widely scattered across central Indiana, including isolated northwest locations on the **10th** and/or **11th**, and a few south-central and northeastern stations on the **23rd**; a widespread freeze, however, hit the region on the night of the **30th**, with observations dropping to 28-33F before the end of the calendar day, (giving most locations their first freeze), before all reporting stations recorded a hard freeze by Halloween morning, led by **22F** at Bloomington, New Castle 3 SW and Washington 1 W, while

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Indianapolis observed 25F – one degree shy of the record low. Indianapolis' normal first freeze and first hard freeze dates are 10/21 and 11/5, respectively, which put 2023's respective occurrences 9 days later and 5 days earlier than normal.

October 2023's temperatures were influenced by a combination of various progressive troughs and several broad, slower-passing ridges, with a resultant mix of both near-normal and unseasonable readings. Anomalous warmth through both the month's start and much of the 4th week drove the above-normal trend, which was partially countered by a potent blast of near-record cold to end the month. Widespread **moderate drought** through most of the month guided more than a week's worth of ~30+ degree diurnal spreads that were focused within the warmest periods; although Indianapolis' milder mornings set-up mainly ~25-30 degree differences on these days. The month's extremes ranged from **90F** on the **3rd** at several sites and **22F** at Bloomington and Washington 1 W on the **31st**. Most locations dropped to/below 32F on two days (**30th**, **31st**), with a third such morning observed at a few of the typically-colder locales on the **23rd**; Lafayette tallied 4 days that fell below freezing per this isolated anomaly on the **10th** and **11th**, with Eagle Creek Airpark and Shelbyville only freezing on the **31st**. October normally sees 2 days fall below freezing at Marion County sites and 3-4 days elsewhere; October 2023's totals were overall about 1 day below normal, yet at normal for Indianapolis. Indianapolis' average temperature through 2023's first 10 months (58.8F) is the 4th highest since 1998 and 7th highest all-time, placing it at the 95th percentile; however, if omitting this year's anomalously mild January-February, 2023's following eight months are actually the 2nd coolest since 2015, while at the (all-time) 79th percentile.

At Indianapolis, October 2023's daily average temperatures were above normal on 16 days, below normal on 13 days and at normal on 2 days. October 2023 tied for the Indianapolis Area's 42rd warmest October since weather records began in 1871, placing it in the 73rd percentile.

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November 2023 continued the fall's warm trend, with most sites nearing the ~2.0-degree above normal readings seen across central Indiana through September and October. Early November exhibited a zonal pattern with storm systems tracking north of the region, which favored generally south-southwesterly winds and resultant unseasonable warmth on the **4th**-**9th**. Canadian high pressure crossing the central U.S. through the mid-month promoted large diurnal temperature ranges, while overall seasonable readings trended to an above normal **third week** of November; this period of days ~5 degrees above normal (driven by an intensifying drought) was the difference from the month following otherwise near-normal temperatures. A strong late month pattern change to broad northwesterly flow brought much colder conditions to the central US, with below normal temperatures crossing the local region through the **25th**-**29th**.

Halloween's near−record cold burst lingered into the **1st** before robust south−southwesterly

winds on the **2nd** returned seasonable highs in the 50s. Reported lows on the **1st**, mainly around 30F, were as low as **24F** at Bloomington and 26F at the Rockville (Parke Co.) COOP station, while Indianapolis dropped to 28F. The **1st**'s unseasonably cold afternoon only reached the 40s, with maximums as low as **42F** at the Frankfort Disposal (Clinton Co.) and 43F at the Anderson 1 N (Madison Co.) COOP stations. Temperatures on the **2nd** rose 25-30 degrees at most locations, while Terre Haute and Bloomington rose a respective +32 and +31 degrees. An overall near-normal day on the **3rd** again featured a higher diurnal spread, including Bloomington rising 30 degrees to 62F.

Near-record warmth followed as winds gusting to around 40 mph on the **6th** and **8th** (see Miscellaneous section below) brought much warmer air off the Mexican Highlands to Indiana. Readings on the **6th** were boosted from around the low 40s to mainly the mid-70s, with diurnal spreads as great as +39 and +38 degrees at Muncie and Bloomington, respectively; with readings as high as **78F** at the Shoals 8 S (Martin Co.) COOP station, while 77F was reported at Rockville and several points south and west, with Indianapolis reaching 75F. Lighter winds on the **7th** allowed for highs closer to 70F, led by **76F** at several southern locations including the Spencer (Owen Co.) and Oolitic Purdue Ex Farm (Lawrence Co.) COOP stations, meanwhile Indianapolis peaked at 71F. The **8th** was the month's distinctively warmest day with the region rising to around 80F, on several locations' increasing 30 degrees or more, including a +32 boost at both Lafayette and Eagle Creek Airpark; highest observations were **83F** at Shoals 8 S and 82F at both the Seymour 1 WSW (Jackson Co.) and Washington 1 W (Daviess Co.) COOP stations, while Indianapolis' 78F mark was only one degree shy of the daily record set in 2020; Bloomington and Terre Haute each observed a daily average temperature of 68F – 22 degrees above normal at both airports. By the numbers, the **9th**'s maximums were also unseasonably high across the region's southeastern half, but these low-70s occurred just after midnight as a cold frontal zone brought much cooler air to the region, displaying a –36 degree change in under 32 hours at Terre Haute, to a daily low of 34F on the morning of the **10th**.

Overall seasonable conditions prevailed during the **10th**-**14th**, albeit with a cold morning on the **11th**, more impressive diurnal spreads on both the **13th** and **14th**, and a resultant milder afternoon on the **13th**. Lows on the **11th** fell to about 10 degrees below normal, with **22F** recorded at Rockville as well as the Farmland 5 NNW (Randolph Co.) and Perrysville 4 WNW (Vermillion Co.) COOP stations, meanwhile Indianapolis fell to 32F. Temperatures on the **13th** rose 30-35 degrees over most locales, led by a +38 differential at Terre Haute, with a +29 degree rise at Indianapolis; afternoon highs in mainly the mid-60s were led by **69F** at the Vincennes 5 NE (Knox Co.) COOP station. An even greater daily temperature change was observed on the **14th**, led by +41 degrees at Terre Haute, with +39 at Muncie, and +29 again at Indianapolis.

Above normal temperatures through November's third week were brought by a continuation of large diurnal ranges. The **15th**'s spreads were the most impressive of the month, with a majority of 1st-order sites rising at least +40 degrees, and ranging from +41 at Terre Haute to +32 at Indianapolis, while both airports rose into the mid- to upper 60s; meanwhile afternoon highs were led by **72F** at Shoals 8 S. This pattern continued into the **16th** with Bloomington boosted +36 degrees while Shoals 8 S took the lead again at **71F**, along with Vincennes 5 NE and Washington 1 W. The **20th** and **21st** switched to modest ranges in readings amid light rainfall,

NOVEMBER 2023 TEMPERATURES (con't)

with milder mornings leading the trend: minimums were as high as 46F in parts of Lawrence and Monroe Counties on the **20th**, and up to 43F on the **21st** across Daviess County.

Late November's pattern turned more active as a deepening upper trough over interior North America shifted much colder air into the Midwest. Cold mornings were the rule during the **24th**-**29th** with widespread teens on the final two days of this period, while steadily decreasing daily highs bottomed-out with a sub-freezing maximum on the **28th**. The **27th** calendar day minimums were as low as **20F** in the late evening at both Lafayette and the Castleton 2 S (Marion Co.) COOP station. The morning of the **28th** brought **10F** to Rockville, while Indianapolis dropped to 17F; subsequent highs made only the mid- to upper 20s, with readings as low as **24F** at both Kokomo 3 WSW and Rushville; Indianapolis' high of 25F was actually the 3rd-lowest maximum of the year. The **29th** brought one more unseasonably cold morning with lows in mainly the upper teens, although **12F** and 14F were observed at Rockville and North Vernon 2 ESE, respectively, while Indianapolis reported 19F; moderating southwesterly winds brought one more day with greater diurnal ranges that included +33 degrees at Bloomington, with afternoon highs rebounding to the low 50s at Terre Haute and points along the lower Wabash Valley. November ended on overall above normal temperatures when the **30th** brought mid to upper 50s across the region, **60F** to a few spots including Columbus, and 58F at Indianapolis.

At Indianapolis, November 2023's daily average temperatures were above normal on 17 days, below normal on 9 days and at normal on 4 days. November 2023 tied for the Indianapolis Area's 34th warmest November since weather records began in 1871, placing it in the 78th percentile.

Fall 2023 Temperature Data for Central Indiana Sites

Site	**Fall 2023 Av Temperature**	Fall Season Normal Temp	**Difference From Normal**
Indianapolis Int'l Airport	**57.5**	55.6	+1.9
Lafayette	**55.3**	53.5	+1.8
Muncie	**56.9**	55.6	+1.3
Terre Haute	**56.9**	54.9	+2.0
Bloomington*	**57.0**	55.1	+1.9
Shelbyville	**58.3**	55.9	+2.4
Eagle Creek Airpark	**57.0**	55.5	+1.5

Fall 2023 Temperature Extremes Across Central Indiana

Site	Highest Temperature	Lowest Temperature
Indianapolis Int'l Airport	90 on 9/4, 9/5	17 on 11/28
Lafayette	91 on 9/5	17 on 11/28
Muncie	92 on 9/5	18 on 11/28
Terre Haute	91 on 9/4	**16** on 11/28
Bloomington	89 on 9/4	**16** on 11/28, 11/29
Shelbyville	92 on 9/4	17 on 11/28
Eagle Creek Airpark	90 on 9/4	18 on 11/28

Precipitation

SEPTEMBER 2023

September 2023's very low precipitation intensified the dry trend that had begun during the latter half of August. September normals are around three inches, yet this year brought overall about one-third as much. A rainier period over the **5th-9th** provided light to moderate rainfall to nearly all of the region. Thunderstorms on the **26th-27th**, focused along a west-northwest to east-southeast band through the region's center, did boost monthly totals closer to normal over several counties. Nevertheless early-month near drought-free conditions deteriorated, along a north to south progression, to widespread moderate drought (**D1**) intensity by month's end. Between the month's more organized rainfall episodes, mid-September featured several days with most of the region observing very light rainfall, especially to the north and west of downtown Indianapolis, where several daily totals of 0.01-0.05" were common. This trend was also noticeable over all 1st-order airports, where monthly totals displayed a composite average at 35% of normal, with 6+ days of measureable precipitation (66% of normal), yet frequency of 0.10"+ reports averaged under 2 days (38% of normal).

September opened with dry conditions continuing across central Indiana, without a trace of rainfall reported anywhere through the **4th**. The September **5th** U.S. Drought Monitor update (released on September 7th) showed an increase in **D0** (Abnormally Dry) conditions from what had been a rather small patch between Covington (Fountain Co.) and Rockville (Parke Co.), to most of the Wabash Valley from Sullivan County to Tippecanoe County, as well as most of Delaware, Hamilton, Madison and Rush Counties, and considerable portions of Henry, Randolph and Tipton Counties.

The **5th-9th** followed with several days of scattered showers, and also thunderstorms on the **5th** across central and southern zones, when mainly late-day and evening rains produced rather

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narrow bands of greater precipitation from the Bloomington area to western portions of the Indianapolis Metro, as well as along the Illinois border, with **1.13"** south of Unionville (Monroe Co.), and as much as **1.20"** in Plainfield (Hendricks Co.) while only 0.06" was picked up not 7 miles east at the NWS office (Marion Co.), meanwhile the Graysville 5 WNW COOP site (Sullivan Co.) recorded 0.62". Two rounds of additional showers on the **6th** brought mainly light totals with small embedded areas over 0.50" – both in the morning along the northern Wabash Valley, with as much as 0.77" in the Lafayette area, and then through the evening over several southern counties with up to 0.93" reported near Guthrie (Lawrence Co.). Light showers persisted, from northern to generally central zones throughout the **7th**; and then through the **8th**'s mainly PM hours and overnight over north-central counties, although essentially all sites reported less than 0.30" both days; drizzle and light showers even lingered into the **9th**, focused near the Indianapolis Metro. Resultant 5-day precipitation was lackluster with 0.05-0.40" common across the region; while isolated heavier amounts included **1.56"** near Guthrie, and **1.30"** both south of Unionville and over the Avon and Plainfield areas (Hendricks Co.).

The September **12th** U.S. Drought Monitor update indicated further expansion of **D0**, especially across northern portions of the region, including all of Montgomery, Boone and Hamilton Counties and all points north; while also expanding westward into much of Hancock and Shelby Counties, as well as all of Jennings County and much of Jackson and Decatur Counties. Widespread very light rains occurred again from late on the **11th** through the afternoon of the **12th** before isolated showers fell late on the **16th**; a combined 0.05-0.15" was common for the 6-day period over central and northern counties. The **17th**'s afternoon showers and thunderstorms that tracked north of Interstate 70 dropped 0.10-0.50" over several northern zones, while limiting greater rainfall to southeastern portions of Boone County and the far southwestern corner of Hamilton County, with **1.02"** in Zionsville.

The September **19th** U.S. Drought Monitor update brought the month's greatest increase in drought intensity to date, with **D1** (Moderate Drought) introduced over the same broad patch spanning Montgomery County to Delaware County and all zones to the north; with **D0** meanwhile enveloping all remaining central Indiana counties, excepting a rather small patch between Bloomington and Greencastle (Putnam Co.). On the **21st**, despite areas along and west of the Wabash River receiving the eastern periphery of eastern Illinois' broad soaking rains, no more than 0.41" was reported, at Graysville 5 WNW. The September **26th** U.S. Drought Monitor update saw yet another broad increase in drought intensity with widespread **D1** spreading over a solid majority of the state and ~90% of central Indiana: the only areas that maintained **D0** status were portions of Sullivan and Warren Counties, while the patch that had avoided any drought intensity between Bloomington and Greencastle was upgraded to **D0**.

Appreciable rains finally reached most of the region over the **26th**-**28th** with numerous showers and scattered downpours in mainly PM thunderstorms. The **26th**'s afternoon cells formed quickly over western counties, dropping isolated small hail, before trending to numerous organized showers over east-central zones through the overnight; rainfall through dawn totaled **2.48"** at Crawfordsville 6 SE, **2.61"** south of Unionville, as much as **1.43"** in Carmel (Hamilton Co.) and **1.57"** northeast of McCordsville (Marion Co.) and as much as **1.41"** in

Rushville. Showers continued into the **27th**, with late day/overnight thunderstorms bringing more much-needed heavy rains along the Interstate 74 corridor; and when coupled with additional precipitation into early afternoon on the **28th**, totaled as much as another **1.39"** just west of Crawfordsville, **1.78"** at the NWS office (and **1.42"** 1.1 miles to the north at Indianapolis Int'l), with **1.94"** more in Rushville, and up to **1.54"** around Muncie. While areas near both Lafayette and Spencer (Owen Co.) received less than 0.25" over this combined 58-hour period, a solid majority of central Indiana picked up a long-awaited 0.50-**1.75"**, led by **3.87"** at Crawfordsville 6 SE, **2.92"** in Rushville, **2.61"** south of Unionville, **2.08"** at Lewisville (Henry Co.), **2.05"** in Carmel, and up to **1.67"** in Muncie; while Indianapolis officially picked-up **1.43"**. Brief minor ponding on roadways occurred in the **27th**'s early evening storm over poorly-drained areas of southwestern Marion County; Indianapolis meanwhile went from having the Area's 2nd driest September in the 153-year record (0.19") to being only 39th driest (1.60"), in less than 2 hours.

September 2023's at times frequent, yet typically very light, rainfall episodes resulted in unseasonably to anomalously low monthly precipitation totals of mainly 0.50 to 1.50" across central Indiana, which were a mere 10-50 percent of normal. Greater precipitation was focused along the Interstate 74 corridor from the Crawfordsville area through Rush County, with small areas recording at least ~3.00"; this maximum band separated scattered areas of totals 2-3" below normal to the north, from a more widespread 2-3" deficit to the south, with several isolated pockets totaling less than 0.25" south/west of Indianapolis. Extremes ranged from only 0.12" in Clay City (Clay Co.) to **3.93"** south of Unionville and **4.30"** at Crawfordsville 6 SE. Most 1st-order/COOP sites recorded their driest September since the near-record September 2020; although it was the driest September since 1979 at West Lafayette 6 NW whose 0.47" total was a ~60-year return, while Perrysville 4 WNW's 0.50" made for the driest September in the station's record (since 1982). Comparable anomalies were observed at Shoals 8 S (whose mere 0.30" produced the 2nd-driest September in the station's 112-year record) and Bowling Green 1 W in Clay Co. (where a measly 0.17" was the site's 2nd driest September and a ~40-year return). Also noteworthy was a greater than 20-year return at Washington 1 W (0.36"), and the 1.16" at Young America which was surprisingly the station's driest September since 1994. Indianapolis' precipitation over the last 12 months (October 2022–September 2023, equivalent to the Water Year 2023) decreased slightly to 35.19", a 8.44" deficit (or only 81% of normal). This is Indianapolis' **driest Water Year in 28 seasons** (33.94", 1994-95), having just undercut the corresponding 12-month totals from both 1998-99 and 2009-10. The 2023 year-to-date total at Indianapolis (led by the very wet March and active summer) rose to **29.72"** (**–4.32"** from normal). Drought Monitor levels intensified through September from essentially no intensity to widespread **D1** by month's end. No river/creek flooding was observed during the month.

September 2023 was the **39th driest** September in the Indianapolis Area since weather records began in 1871, placing it in the **25th percentile** for precipitation of all recorded Septembers. This continued the slightly below normal rainfall trend seen in August 2023, as well as the below normal trend from September 2022. Four of the last five, and eight of the last eleven Septembers at Indianapolis have recorded below normal precipitation.

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October 2023's overall slightly below to near normal precipitation brought a partial improvement to moderate drought conditions while Indianapolis continued to sport the driest rolling-12 month period in nearly 30 years. October normals are generally 2.90-3.60" across the typical north to south gradient, although 2023's distribution ranged over 1.90-5.20" in an opposite (wetter to the north) direction, with most locations observing the lower amounts of this range. Overall sub-normal precipitation totals were driven by the lack of downpours from strong or severe thunderstorms, with instead a greater than normal number of days with very light rainfall and any few days with heavier amounts contained to northern counties.

The overall dry pattern seen since mid-August continued into October, albeit on the heels of a couple days of scattered showers and thunderstorms near the end of September that had totaled 0.50-2.00" over most of the region. The October **3rd** Drought Monitor update (released October 5th) showed overall subtle changes, with only an increase in intensity from **Abnormally Dry** (**D0**) to **Moderate Drought** (**D1**) over a patch through most of Putnam, Owen and Monroe Counties, as well as much of Sullivan and Warren Counties; this was the first time the entire 39-county region was in **D1** (or worse) **since 8/7/2012** ... although *nearly* all of central Indiana was in at least **D1** at times during Nov-Dec 2022 when the region was experiencing an overall worse drought.

Showers returned on the **5th**, increasing in coverage through morning hours ahead of a slowly approaching cold front, with much-needed widespread afternoon rains lingering into the evening; totals of 0.40-**1.00**" were common, while lesser amounts fell over portions of the Wabash Valley and far southern counties, with isolated **1.00"+** reported over northeastern zones, including **1.14"** southwest of McCordsville (Marion Co.), and **1.05"** in Kokomo, Anderson (Madison Co.) and northern Delaware County. The October **10th** Drought Monitor update exhibited no changes with essentially all of central Indiana maintaining **D1** intensity.

The evening of the **11th** found a few thunderstorms tracking east between the Bloomington and Indianapolis areas before late night showers crossed far north-central zones; radar estimates indicated locally **1.00"+** fell over far northeastern Monroe County and far northern Brown County. The **13th**'s approaching storm system and cold front brought evening rain ahead of showers that continued overnight, which altogether produced the region's best 24-hour rainfall in two months; moderate to heavy rainfall north of I-70 was led by a local bulls eye over southern Tipton County where **1.82"** was measured at Tipton 5 SW, meanwhile the fall's drier trend continued over the region's south-southeastern half where a modest 0.10-0.40" was common; other noteworthy observations included **1.46"** at the Pence 1 SW (Warren Co.) COOP site and up to **1.40"** reported in both Boone and Clinton Counties, while Indianapolis recorded a modest 0.42". Two further rounds of mainly light showers crossed the region during the **14th** daytime and the **15th**'s evening and overnight, with greatest 1-day report the 0.21" through the morning of the **16th** in Kilmore (Clinton Co.), while 2-day totals were as great as 0.27" southwest of Greensburg (Decatur Co.).

The October **17th** Drought Monitor update showed improvements in drought intensity across small portions of central Indiana's northern tier with a downgrade from **D1** to **D0** seen over

essentially all of Clinton, Howard and Tipton Counties and portions of Carroll and Warren Counties; while **D1** continued over the remaining ~90% of the region. The **19th**-**20th** then featured a more prolonged rain-to-scattered showers episode that lasted almost 36 hours within the two calendar days: steadier rain on the **19th** was again greatest north/west of Indianapolis, with an isolated late-day thunderstorm along the Howard-Tipton County line contributing to estimated local totals in excess of **1.00”**, the **20th**'s couple rounds of slowly progressing showers were then focused along the northern tier, with up to 0.25-0.60" in northeastern counties; the region's overall totals were greatest (0.77-0.80") near both Young America, Farmland (Randolph Co.) and in Homer (Rush Co.), while most central and southern counties picked up 0.30-0.50".

The October **24th** Drought Monitor update showed drought intensity removed from much of northern Indiana, although the only noteworthy local improvement was **D0** ending over most of Howard County, while the widespread combination of **D0** (and more predominant) **D1** still prevailing across central Indiana. Occasional scattered showers crossed the region through mainly morning hours on the **25th**, the **26th**'s afternoon, and across southern counties on the morning of the **27th**, with resultant light rainfall again greatest over northwest counties; with two COOP sites leading 36-hour totals: 0.72” at Pence 1 SW and 0.65" at Perrysville 4 WNW, while 0.40" was observed southwest of Greensburg.

The wet trend expanded through October's final days amid a slowly passing and lingering frontal boundary that promoted three more periods of rain. Showers and isolated thunderstorms during the **27th** overnight brought locally moderate rainfall in narrow bands from the Upper Wabash Valley to the Interstate 70 corridor, before lighter showers lingered through the morning of the **28th** over the region's southeastern half; 18-hour rainfall reported as great as 0.70-0.76" on the south side of Lafayette, east of Ladoga (Montgomery Co.) and in Southport (Marion Co.). The next and main batch of rain brought light rainfall along the US-50 corridor on the afternoon of the **28th** before expanding over all counties through the night, leaving broader bands of moderate rainfall north/west of Indianapolis, along a line from Owen to Rush County, and south of US-50; the top reports were 0.90" in Mulberry (Clinton Co.), 0.97" east of Martinsville (Morgan Co.), and **1.06"** in Buddha (Lawrence Co.), with many observations around 0.50" from places in between. The final round fell mainly during the **29th**'s PM hours, with showers lingering early on the **30th**; 0.25-0.50" amounts were common, with up to 0.63" at New Castle 3 SW. 2.5-day totals were 0.80-1.40" for a solid majority of the region with greatest totals including **1.80"** near Young America, up to **1.76"** in Lafayette, ~**1.65"** in Buddha and **1.53"** in Southport.

The season's first flakes graced several counties on the morning of the **30th** when flurries reached the ground within a triangle between Terre Haute, Bloomington and Vincennes, as well as from Lebanon to Indianapolis; no measurable snowfall was reported. The October **31st** Drought Monitor update showed substantial improvements in drought intensity; **D1** finally retreated to south of a Rockville-Shelbyville-Greensburg line, and out of most of the Indianapolis Metro, with all remaining portions of central and northern zones improved by one intensity level (mostly to **D0**, except for several north-central counties that improved to no drought intensity. October **31st** amid the arrival of much colder air from robust breezes, saw widespread flakes, scattered flurries and a few stronger snow showers: midday northern tier

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flurries expanded to north of I-74 later in the day, before the greatest expanse of convective flurries through the evening, which saw visibility drop to 2.5 miles in a snow shower that passed between Lafayette, Frankfort and Noblesville, to even a couple rounds of flurries over the Bloomington and Columbus areas, and flakes observed as far southwest as the Elnora (Daviess Co.) COOP station; the only measurable snow reports were **0.2"** in Anderson (Madison Co.), and **0.1"** in both Burlington (Carroll Co.) and Frankfort (Clinton Co.). Indianapolis' normal first trace of snow is November 9th, this year's occurrence was 10 days earlier.

October's overall slightly below normal precipitation ranged from adequate to ample rains across central Indiana's northern half (totaling 2.80–5.20") to generally more lackluster episodes for most zones south of Interstate 70 (1.90–3.20"); with extremes ranging from **1.90"** in Washington (Daviess Co.) to **5.17"** near Young America. About ~80% of monthly totals came from three periods: moderate rainfalls through both the **5th** and **13-16th**, and a widespread ~**1.00"** or so during the **28-29th**; with the remaining ~20%'s vast majority falling amid lighter rains over the **19-20th**. The frequency of days with 0.10-0.99" was overall near normal, although days with less than 0.10" were more common than usual, while 1.00"+ reports were mainly limited to many of the observation sites north of the I-70 corridor. Muncie measured 0.70"+ on 3 calendar days – **5th**, **13th**, **29th**, but more notably received nearly 1.00" over two 2-day tandems (1.10" on **13th**-**14th**, 0.99" on **28th**-**29th**). While the region recorded less precipitation in October 2022, the September-October 2023 tandem continued the overall dry trend for these two months established in 2022. Indianapolis' precipitation over the last 12 months (now November 2022–October 2023) increased over an inch to 36.24", which was still a 7.39" deficit (or only 83% of normal), and the lowest for this 12-month period since 2009-10. The 2023 year-to-date total at Indianapolis (following a very wet March and active summer) rose to **32.19"** (**–5.07"** from normal). Drought Monitor levels that had started as widespread **D1** steadily improved through the mid to late month to ultimately a **D0**/**D1** split outside of drought-free north-central counties. No river/creek flooding was observed during the month.

October 2023 was the 75th driest (78th wettest) October in the Indianapolis Area since weather records began in 1871, placing it in the 49th percentile for precipitation of all recorded Octobers. This was a trend towards normalcy following the very dry months September 2023 and October 2022.

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November 2023's well below normal precipitation brought a distinctive end to Indianapolis' 7th-driest (tied) autumn on record. Rainfall totals mainly under 1.00" allowed **moderate drought** (**D1**) to become the region's prevailing intensity, with Indianapolis continuing to have the driest rolling-12 month period since 2009-10. November normals are generally 2.90-3.70", but with the typical north to south gradient skewed higher to the southeast per Terre Haute normally collecting 0.40" less than the Indianapolis Area (3.05" vs. 3.45"). November 2023 recorded about 2.50" less than normal, or a mere ~25% of typical expectations.

The overall dry pattern seen across central Indiana since mid-August 2023 had a partial reprieve through October amid several moderate rainfalls, and a well-received 1.00-1.50" mid-month event across northern counties. October's final week was damp, including 5-day precipitation totals of 1.00-2.00" over the whole region. The October 31st U.S. Drought Monitor update (released November **2nd**) showed a noticeable improvement as the once prominent **Moderate Drought** (**D1**) had receded to south of a Rockville-Mooresville-Shelbyville line, with no drought intensity over Clinton, Howard, or Tipton Counties, and **Abnormally Dry** (**D0**) intensity over the zones in between. However, a regime change as November began, reinstated prolonged dryness.

The first half of November was exceedingly dry, outside of a few hours of scattered light rain on the overnight of the **8th** that focused along Interstate 70 from Hendricks to Henry Counties, with as much as 0.41" reported in New Palestine (Hancock Co.). The month's first 16 days were otherwise essentially devoid of rain, with the only other scattered sprinkles and/or light rain on the **4th**. Weekly Drought Monitor updates maintained the status quo of **D1** south/west of Shelbyville, with the **14th**'s update showing a small northward expansion of **D0** through all of Warren County and nearly all of Clinton and Carroll Counties.

The first of three latter-month organized precipitation events crossed the region on the **17th**, with rain sliding eastward during AM hours before tapering off during the afternoon. Briefly moderate rainfall rates around dawn over Shelby and Rush Counties led to a 0.87" report near Waldron (Shelby Co.), with the tailing maximum axis extending to a 0.84" observation near Tulip (Greene Co.), and isolated 0.50"+ reports from the western and northern portions of the Indianapolis Metro, while most of the upper Wabash Valley did not measure any rain. The second event was drawn out from midday on the **20th** to midday on the **21st**, yet could only muster 0.20-0.50" for most locations; nevertheless 0.63" was recorded at the Elnora COOP station, with 0.57" reported in Plainville (both in Daviess Co.). The **21st**'s Drought Monitor update again exhibited mainly a status quo mixture of **D1** south/**D0** central-north with a subtle northward advancement of **D1** into the US-36 corridor from around Rockville to southern Marion County, and **D0** northward past Tipton and into western Howard County.

The arrival of much colder air during November's last week was marked by a final light precipitation event on the **26th** whose rain mixed with our changed to wet snow during the morning along the Upper Wabash Valley, while occasional flurries were reported during the day at both the Lebanon 6 W (Boone Co.) and Tipton 5 SW (Tipton Co.) COOP sites. Snow lasting through the early afternoon brought an estimated **1.2"** at Perrysville 4 WNW as snow melted as it fell, with other reports over an inch in parts of Fountain County, while up to 0.4" was reported northwest of Lafayette (Tippecanoe Co.), and 0.1" was measured as far southeast as far northeastern Hendricks County. The light rain ended as a few flakes or a flurry in the evening over several central counties. Rather uniform precipitation totals ranged within 0.15-0.25" for most locations.. Scattered flurries graced many northern and central counties through AM hours on the **28th**, with no measureable snow reported. The **28th** Drought Monitor showed more northward deterioration, with all north-central counties (as well as almost all of northern Indiana) enveloped with **D0**, while **D1** expanded over the rest of the I-70 corridor, Indianapolis Metro, and all northwestern areas west of I-65.

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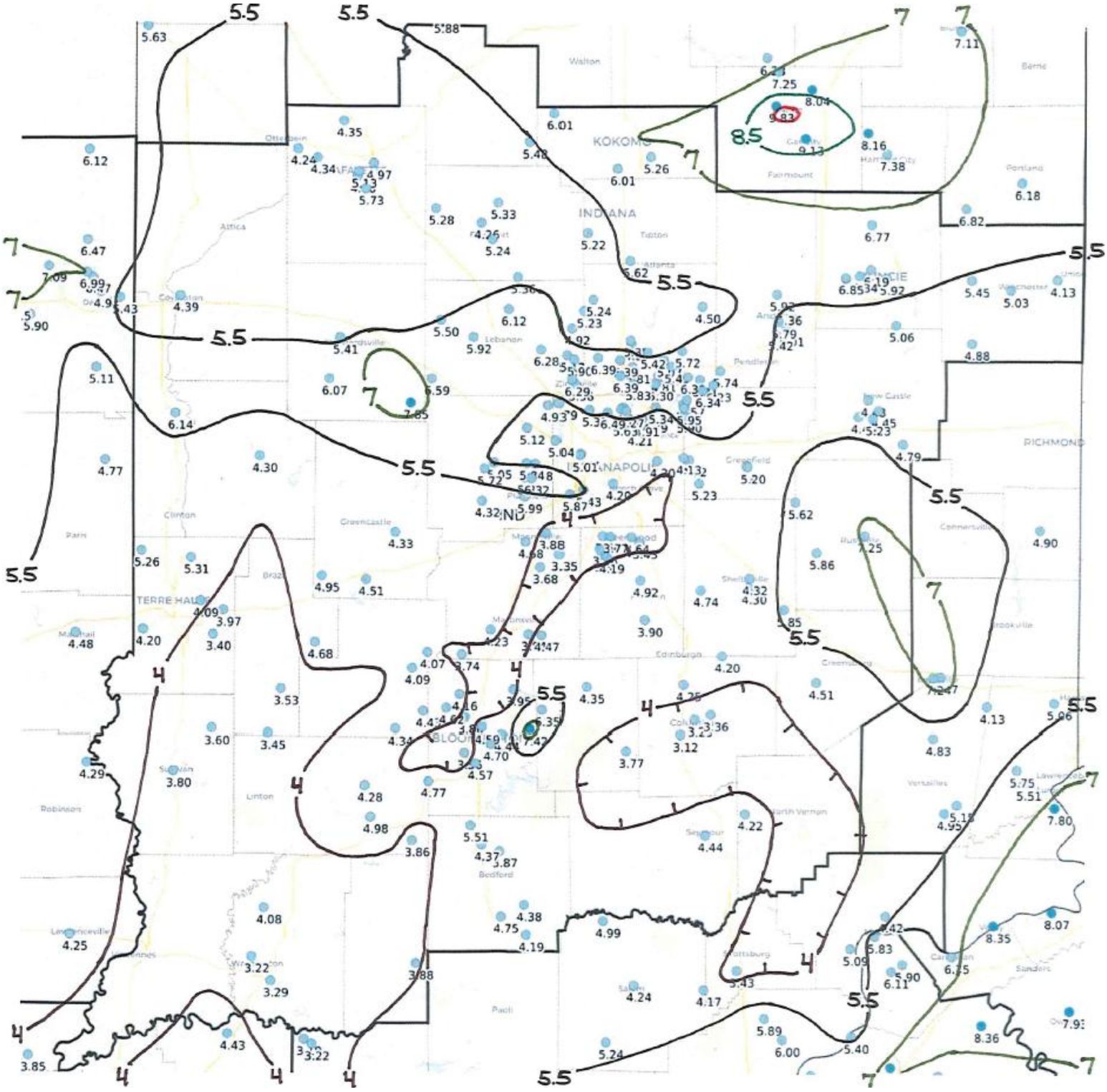
November's well below normal precipitation was ~2-3" from seasonable expectations, with extremes ranging from **0.30"** in western portions of Tipton County to several small areas nearing **1.35"** in Greene, Monroe, Henry and Rush Counties. Most locations picked up ~30-60% of their low monthly total from the light to moderate rainfall during the **17th**'s AM hours. Ignoring calendar day boundaries, the greatest 24 hours of rainfall at 1st-order sites ranged from 0.29" at Lafayette (during the **20th**-**21st**) to 0.65 at Bloomington (**17th**), with Indianapolis following with only 0.31" (**17th**). Measurable rain fell on only 4-6 days (~half of normal), while only 2-4 days produced 0.10"+ (well shy of the ~6 day normal). The first half of November was generally devoid of organized rainfall, with half of central Indiana not measuring any precipitation through the **16th**, with not even a trace over portions of several west-central and southern counties. About half of the region's COOP stations recorded their 2nd-driest or driest November: Columbus' **0.52"** was 2nd only to 1917, Williams 3 SW's **0.75"** was 2nd only to 1949, Tipton 5 SW's **0.33"** was the driest in the site's 45-year record; with several other sites also exhibiting a greater-than-40-year-return period - West Lafayette 6 NW's **0.48"**, West Lafayette Sewage's **0.45"**, and Perrysville 4 WNW's **0.42"**, the latter two being all-time driest Novembers; several other noteworthy monthly totals included Frankfort Disposal's **0.52"** (their driest since 1976), Oolitic Purdue Ex Farm's **0.61"** (their driest in at least 105 years), Vincennes 4 E's **0.74"** (the 3rd driest in the station's 112-year record), Lafayette 8 S' 2nd-driest at **0.49"**, and Spencer's **0.93"**, which was still the 2nd-driest November in the 77-year record despite the greater total. Indianapolis' precipitation over the last 12 months (now December 2022–November 2023) dropped slightly to 35.75", which is a 7.88" deficit (or only 82% of normal), and the lowest for this 12-month period since 2009-10. The 2023 year-to-date total at Indianapolis (following a very wet March and active summer) rose to **33.12"** (**–7.59"** from normal). Drought Monitor level trends showed drought intensifying by one of more categories: from **D1** across most southern counties and **D0** elsewhere excepting north-central zones ... to **D1** prevailing over the central and southern ~80% of the region, with **D0** across most northern counties. No river/creek flooding was observed during November. Indianapolis' trace of snowfall tied 31 other Novembers, and placing it in the 4th-26th percentile of snowfall for the year's 11th month, yet only 0.5" shy of the median average for November.

Fall 2023 finished with only 5.00" at Indianapolis, tying for the **7th driest** (**5th percentile**); coming on the heels of Fall 2022's 4.96", the combined 9.96" made for the 2nd-lowest combined total from consecutive fall seasons (behind 1963-64's 7.63" and ahead of 1998-99's 11.15"). Anomalously low seasonal totals at COOP sites were overall less noteworthy than November's rankings: **3.01"** at Washington 1 W and **3.97"** at Shoals 8 S were 2nd-driest in over 110 years at both sites, while **4.43"** at Perrysville 4 WNW was the driest autumn in the station's 42-year period; **2.93"** at Columbus was the lowest total of all COOP sites and the station's 4th driest on record (a 33-year return).

Fall 2023 Total Precipitation, Through the Afternoon of 11/30
As Reported By Central Indiana CoCoRaHS Observers



For the period 700 AM EDT 9/1/2023 -to- 300 PM EST 11/30/2023. Data is unofficial.

Fall 2023 Precipitation Data for Central Indiana Sites

Site	Fall 2023 Precipitation	Fall Season Normal Precip	Diff. From Normal	Greatest Daily Rainfall
Indianapolis Int'l Airport	**5.00**	9.81	**–4.81**	1.42 on 9/27
Lafayette	**4.27**	8.37	**–4.10**	0.67 on 10/29
Bloomington	**3.55**	11.03	**–7.48**	0.65 on 11/17
Muncie	**5.95**	9.28	**–3.33**	0.95 on 9/27
Terre Haute	**3.76**	9.42	**–-5.66**	0.59 on 10/13
Shelbyville	**5.16**	9.95	**–4.79**	**1.50 on 9/27**
Indianapolis Eagle Creek AP	**4.83**	9.07	**–4.24**	0.83 on 10/5

Severe Weather

Despite the **September 26th**'s strong thunderstorms across western counties, no severe weather, nor river/stream flooding was reported in central Indiana throughout Fall 2023. This was the region's first severe-free September since 2018, and **only third such fall since 1998**.

For info on severe weather in other areas during the fall season, visit the Storm Prediction Center "Severe Weather Event Summaries" website at spc.noaa.gov/climo/online

Miscellaneous Weather

SEPTEMBER 2023's peak wind gusts at 1st-order airports ranged between a mere 25 mph at Bloomington and the rather modest 36 mph at Eagle Creek Airpark, with the majority of these seven sites not reaching 30 mph - a far cry from the generally breezy conditions that lasted from late 2022 through July 2023, and the region's most quiescent month **in at least the last 15 years**. Breezier days included the **5th**, **6th**, and **26th** when most locations gusted to 25 mph or greater; while Indianapolis was the only site with this distinction on the **27th** when recording the airport's monthly max gust of **29 mph**. The month's second week was marked by generally low peak wind gusts, including a 10-day period (**7th**-**16th**) at both Bloomington and Terre Haute where gusts never reached 20 mph. The final three days of September exhibited the most tranquil wind trends, when the average peak gust across all 1st-order sites was only 15 mph, with the lowest daily reading being 11 mph at Shelbyville on the **29th**.

Fog was, despite the overall lack of appreciable rainfall, common, especially through the month's second and third weeks: Indianapolis was an outlier with only 9 days of fog in September, with other 1st-order sites ranging from 14 days at Shelbyville to 21 days at Bloomington. Fog was observed at <u>all</u> sites on the **7th**, **10th**, **13th**, **27th**, **28th**, **29th**, and **30th**; and at <u>most</u> airports on the **3rd**, **9th**, **11th**, **12th**, **16th**-**18th**, and **25th**. Fog was reported on 11 of 13 days

at both Lafayette (through the **6th**-**18th**) and Bloomington (**1st**-**13th**), while Terre Haute observed fog on the month's final 6 days. Dense fog was prevalent during both mid-month and September's final days, ranging from 3 days at Indianapolis to 7 days at Muncie, and being tallied on 4 days at most sites. Dense fog was recorded at most 1st-order airports on the **13th**, **28th**, **29th**, and **30th**, and on the **27th**-**29th** at Indianapolis. This was the first three-peat of days with visibility observed to a 1/4 mile or less in fog at Indianapolis Int'l Airport **since February 2019**.

Thunder's infrequence followed the overall dry pattern, ranging from 1 day at Muncie to 4 days at both Lafayette and Eagle Creek Airpark, with all other 1st-order sites reporting thunder on 3 occasions. Thunder occurred at all central and southern airports on the **5th**, and essentially all sites on both the **26th** and **27th**.

Despite limited precipitation, September was marked by noticeable humidity, from the **2nd**-**6th**'s unseasonably high dewpoints into the low 70s each day, and readings as high as 74F at Terre Haute on the **4th**; to low-moderate humidity through the **24th**-**30th**. More autumnal air did reach the region on the **23rd** when dewpoints finally fell below 45F, bringing relative humidity values as low as 24% at Muncie.

OCTOBER 2023 was devoid of any strong or severe gusts at any of the seven 1st-order airports, although quiescent days were also infrequent. Five airports observed their greatest peak wind gust on the **6th**, ranging from 40 mph at Indianapolis to 35 mph at both Shelbyville and Terre Haute; next in line were the **21st**'s greatest gusts at Lafayette (37 mph) and Bloomington (35 mph), and the **31st** when Eagle Creek Airpark matched its 36 mph peak from the **1st**, and all sites gusted to at least 32 mph. Several other breezier days, where most airports gusted as high as 27-32 mph, included the **7th**, **10th**, **14th**, **18th**, **20th**, **26th**, and **27th**. Several quiescent days also occurred, especially through very early October; as airports gusted no higher than 17 mph on both the **2nd** and **17th**, with most gusting under 20 mph on the **1st**, **3rd**, **12th**, **23rd**, and **29th**.

Fog was seasonably frequent and most common through both the mid-month and October's final week; 1st-order sites ranged from 10 days at Indianapolis to 20 days at Lafayette, although the majority of locations observed fog on 12-14 days. Fog was recorded at <u>all</u> sites on the **5th**, **14th**, **19th**, **20th**, **28th**, and **29th**; and at <u>most</u> airports on the **1st**, **2nd**, **13th**, **15th**, **16th**, **18th**, and **30th**. Fog was reported on 8 consecutive days at Bloomington (**13th**-**20th**) and on 7 days in a row at Lafayette (**25th**-**31st**), and ironically at Eagle Creek Airpark on the **9th** and **11th** when observed at no other 1st-order station. The rather dry conditions promoted less dense fog, as it was limited to Terre Haute and Bloomington on both the **1st** and **2nd**, Bloomington again on the **6th** and **18th** **29th**, and Lafayette on the **20th**-**21st**.

Thunder was sparse throughout October, limited to only Indianapolis, Bloomington and Eagle Creek Airpark on the **11th**, Lafayette on the **19th** and **28th**, and also Shelbyville on the **28th**.

Humidity extremes were modest with no 1st-order site observing a relative humidity lower than the 26% seen at Lafayette and Muncie on the **10th**. Moderate humidity did return to central Indiana on the **5th**, **13-14th**, and **27th**, with dewpoints at Terre Haute briefly as high as 65F on the **5th** and 67F on the **27th**, with Bloomington's dewpoint also peaking at 65F on

October 27th. Any fires from farm equipment sparking on rocks, etc. were brief and small with no wildfires observed.

NOVEMBER 2023 saw no wind gusts recorded over 45 mph at any of the seven 1st-order airports in November. The **8th** was the overall windiest day with essentially all sites gusting to 35 mph or greater, and 41 mph observed at both Muncie and Shelbyville. Robust breezes were also prevalent on the **6th** (when Bloomington hit 45 mph and Indianapolis reached 40 mph) and the **26th** (when Eagle Creek Airpark recorded 38 mph). Less-breezy days where peak gusts still averaged 30 mph or greater favored the late month: **3rd**, **10th**, **21st**, **27th**, and **30th**. Quiescence was occasionally observed, when gusts peaking at 20 mph or less at all sites on the **5th**, **15th**, **19th**, and **25th**, with peak gusts averaging only 11-12 mph on the **5th** and **19th**.

Fog was infrequent for late autumn, yet at times pervasive; frequency at 1st-order sites ranged from 5 days at Shelbyville to 11 days at Lafayette, with 7 days at three other airports. Fog was recorded at all sites on the **5th**, **17th** and **21st**; and at most airports on the **7th**, **20th**, and **26th**. Fog was reported on 5 of 6 days at Lafayette (**17th**-**22nd**) and on 4 of 5 days at Marion County airports (**5th**-**9th**). Intensifying drought conditions promoted less dense fog, with reports limited to Bloomington and Terre Haute on both the **5th** and **7th**, and also on the **5th** at Muncie and Lafayette, as well as the **18th** at Lafayette.

No thunder was reported at any of the seven 1st-order airports throughout November.

Humidity extremes were limited to the first half of the month, with moderate humidity on the **8th** bisecting very low daily minimum relative humidity values on both the **3rd** and **13th**-**15th**. Relative humidity on the **3rd** dropped to 22% at Shelbyville, with 25% observed at Marion County airports. Dewpoints rose to 60F for 4-8 hours for most locations through PM hours on the **8th** into very early on the **9th**, with dewpoints as high as 63F at Terre Haute and Marion County airports. More extended dryness followed on the **13th**-**15th**, with Bloomington's relative humidity dropping to 17-18% each day, with all other 1st-order sites recording 20-25% on both the **13th** and **14th**, Indianapolis' monthly minimum was 21% on the **13th**

Winter 2023-24 Outlook for Central Indiana

The official outlook for the 2023-24 winter season (December–February) from the Climate Prediction Center, indicates slightly greater chances for above normal temperatures across central Indiana. The outlook also indicates equal chances for above, below, or near normal winter precipitation across the region.

At Indianapolis, the normal winter temperature is **31.5 degrees**, the normal winter precipitation is **8.47"**, and the normal winter snowfall is **21.2"**.

Data prepared by the NWS Indianapolis Weather Forecast Office's Indiana State Climate Team
Questions should be referred to nws.indianapolis@noaa.gov

Indianapolis Fall 2023 Monthly Data

INDIANAPOLIS **SEPTEMBER 2023** SUMMARY

	Average Temp	Precipitation	Highs ≥ 70°	Lows ≤ 40°
September 2023	**69.9**	**1.60**	**30**	**0**
Normal September	67.8	3.14	25	1
Diff from Normal	**+2.1**	**–1.54**	**+5**	–1

September 2023 All-Time Ranks... **Temperature: 33rd Warmest** (Tied)
Precipitation: 39th Driest

INDIANAPOLIS **OCTOBER 2023** SUMMARY

	Average Temp	Precipitation	Highs ≥ 70°	Lows ≤ 40°
October 2023	**57.5**	**2.47**	**13**	**6**
Normal October	55.5	3.22	11	11
Diff from Normal	**+2.0**	**–0.75**	+2	**–5**

October 2023 All-Time Ranks... **Temperature: 42nd Warmest** (Tied)
Precipitation: 75th Driest / 79th Wettest

INDIANAPOLIS **NOVEMBER 2023** SUMMARY

	Average Temp	Precipitation	Highs ≥ 70°	Lows ≤ 40°
November 2023	**45.2**	**0.93**	**3**	**24**
Normal November	43.3	3.45	2	22
Diff from Normal	**+1.9**	**–2.52**	+1	+2

November 2023 All-Time Ranks... **Temperature: 34th Warmest** (Tied)
Precipitation: 7th Driest / 6th Least Snowiest (Tied)

INDIANAPOLIS FALL 2023 SUMMARY

	Average Temp	Precipitation	Highs ≥ 70°	Lows ≤ 40°
FALL 2023	**57.5**	**5.00**	**46**	**30**
Normal Fall	55.6	9.81	38	34
Diff from Normal	+1.9	**–4.81**	**+8**	–4

Fall 2023 All-Time Ranks... **Temperature: 17th Warmest**
Precipitation: 7th Driest