

Spring 2023 Review

of Weather Conditions Experienced In Central Indiana

Tied 37th Warmest on record at Indianapolis

Tied 75th Driest (Tied 78th Wettest) on record at Indianapolis

Tied 50th Least Snowiest on record at Indianapolis

Temperatures

MARCH 2023

March 2023 was near to slightly above normal, ending the persistent anomalously mild trend seen through the first two months of 2023. About 10 days were notably above or below normal, including remnant anomalous warmth on both the 1st and 6th, several unseasonably cold days between the 13th-14th and 18th-19th, and finally two more isolated mild days on the 23rd and 31st. Otherwise near-normal or slightly above/below normal conditions were common amid the rather damp pattern, and also considerable cloudiness which was prevalent through the early and mid-month. Overall milder weather (relative to seasonable normals) lasted through the 9th, while lower temperatures mainly prevailed for the latter two-thirds of the month. At Indianapolis, the 9th ended 32 of 34 consecutive days above normal, as well as 60 such days out of the year's first 68. The only record at Indianapolis was the 1st's high maximum of **76F**, which shattered the old record (71F, 1976).

The 1st's record shattering reading at Indianapolis was also only the third time in the 153-year record the mercury surpassed 75F this early in the year (following 2/20/2018 and 2/25/2000). 70s were the rule across central Indiana on the 1st, with **80F** at the Columbus (Bartholomew Co.), and **82F** at the Shoals 8 S (Martin Co.) COOP stations. The 6th's warmth included mainly low to mid-70s, with highest readings again at Columbus (**76F**) and Shoals 8 S (**78F**), while Indianapolis reached 72F. Coldest locations through the mid-month chill were: **20F** on the 14th at both the Rockville (Parke Co.) and Whitestown (Boone Co.) COOP stations; **14F** on the 15th at Rockville while the Farmland 5 NNW (Randolph Co.) COOP farm dropped to 15F; **12F** on the 18th at West Lafayette 6 NW (Tippecanoe Co.); and **12F** on the 19th at Rockville as well as Lafayette 8 S (Tippecanoe Co.) and New Castle 3 SW (Henry Co.). The warmer late month days were led by Shoals 8 S and the Vincennes 5 NE (Knox Co.) COOP station: with their respective reports of **77F** and 75F on the 23rd and **72F** and 70F on the 31st; Indianapolis correspondingly peaked at 67F and 68F.

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The 18th featured the month's lowest maximum, with nearly all of the region held below freezing, and 24-hour highs through dawn on the 19th only reaching the low to mid-20s across many spots north of Interstate 70. Highest minimums mainly occurred on the 31st, with many upper 40s observed, and 51F as far north as the Martinsville 2 SW COOP station (Morgan Co.); other mild overnights included upper 30s to mid-40s on the 6th, and mostly low to mid-40s on the 22nd and 24th, which flanked an even warmer trend on the 23rd when several far southwest sites were held in the low to mid-50s, while Indianapolis only fell to 44F.

Frequency of March days that fall below freezing normally ranges from 15 to 19 across central Indiana's seven 1st-order airports, while frequency of days held to 32F or below are normally 1 (or 2-3 across the region's northern tier). March 2023's tallies confirmed the slightly warmer than normal readings, with days falling below freezing ranging from 12 at Marion County sites to 18 at Lafayette, while days held below freezing was 1 at all seven airports. Extending these statistics to the first three months of the year, reveals the seven airports normally fall below freezing on 63-69 days and are normally held below freezing on 17-25 days; so far in 2023 the respective tallies are only 42-59 and a mere 3-6.

By the numbers Indianapolis' March 2023 temperatures were slightly below normal, yet it being the coolest March in four years was the bigger story. Despite February's anomalously mild readings, March did finish 2.0 degrees warmer; the last time these two months had monthly means this close was 2018 when March finished at a rather low 38.9°F. At Indianapolis, March 2023's daily average temperatures were above normal on 14 days and below normal on 17 days. Nevertheless, it was the 64th mildest March for the Indianapolis Area since weather records began in 1871, placing it in the 58th percentile.

APRIL 2023 TEMPERATURES

April 2023 was near to slightly above normal, continuing the rather seasonable trend seen in now seven of the past nine months: excepting the anomalously mild January and February 2023, all other months since July 2022 have finished within ~1 degree of normal at Indianapolis. Contributing to this overall normal pattern in April 2023 were a week's worth of unseasonably mild days through the month's first half (on the 3rd-5th and 12th-15th) and a noticeably cooler latter half that was led by, at times anomalously low, high temperatures (on the 17th, 22nd-24th, and 30th). Days with more seasonable readings, included the 6th-11th as the slow passage of Canadian high pressure brought a gradual trend from slightly below to slightly above normal marks, as well as the 25th-29th when more modest sub-normal temperatures persisted. Two daily records were tied at Indianapolis: the 4th's high maximum of 80F (also set in 1882 and 1929), and the 24th's low minimum of 28F (also set in 1910).

April started with near normal temperatures, although a colder morning on the 2nd brought a freeze across the region's northern tier and down the Wabash Valley, with readings as low as 28F at Lafayette and at both the Rockville (Parke Co.) and Crawfordsville 6 SE (Montgomery Co.) COOP stations, while Indianapolis dropped to 34F. Very mild conditions followed on the 3rd-5th, with readings on the 3rd rebounding as much as 34 degrees during the day at both Eagle Creek

Airpark and the Tipton 5 SW (Tipton Co.) COOP station. High temperatures over these three days were mainly in the 70s, except for the 4th where mid-70s to low 80s prevailed; the Shoals 8 S (Martin Co.) COOP station had the highest marks to start, **79F** on the 3rd and **84F** on the 4th; while the Elnora (Daviess Co.) COOP station lead the pack with **79F** on the 5th; Indianapolis meanwhile topped out at 76F, 80F, and 76F, respectively. Indianapolis' **80F** maximum on the 4th tied the Area's **daily record** from both 1882 and 1929. The 4th also saw Bloomington's highest daily minimum of the month, **58F**.

The 6th was noticeably cooler with maximums only around 50F, and as low as **48F** at the West Lafayette 6 NW (Tippecanoe Co.) COOP station, while Indianapolis reached 52F. Morning lows on the 7th found freezing temperatures across many western and northern zones, with **28F** reported at both Lafayette and Rockville. A slow moderation followed through the 11th from slightly below to slightly above normal readings, with highs trending from the 50s to the 70s while low temperatures were maintained between the mid-30s and low 40s.

April 12th-15th brought four warm days to the region with highs around 80F and daily low temperatures exhibiting a rather broad distribution while trending from roughly 50F to roughly 60F. The 12th was as warm as **81F** at Shoals 8 S, Rockville, and the Kokomo 3 WSW (Howard Co.) COOP station. The 13th saw the greatest diurnal ranges after a cool morning in the 40s, with Shoals 8 S again taking the top ob (**84F**); Bloomington meanwhile rose 40 degrees from 41F to 81F. The 14th brought Indianapolis' warmest morning of the month (**59F**) before the day's highest maximum (**82F**) was recorded at Shoals 8 S. The 15th saw April's highest minimums at eastern sites, including a very mild **63F** at Muncie; afternoon highs peaked as high as **83F** at Shelbyville, Shoals 8 S, and Tipton 5 SW.

April's third week had generally faster changes in temperature trends, starting with a fast transition through the 16th to much cooler weather. The 17th's morning lows were down to the 30s, although only Lafayette dropped to **32F**; a sharp edge between overcast and clear skies across the region brought a strong gradient in afternoon maximums, ranging from **38F** at Farmland 5 NNW (Randolph Co.) to 64F at Shoals 8 S, with Farmland's being the record low-high for the date of the station's 110 years of data; Lafayette and Muncie also observed their low-high for the month, **43F** and **42F**, respectively; while Indianapolis managed 52F. The 18th saw the most widespread freeze of the month to-date, with only southwestern and far southern counties staying above freezing; the lowest reports were **26F** at Rockville, and 27F at both Lafayette and the Rushville (Rush Co.) COOP station; Indianapolis dropped to 30F, the airport's first freezing mark since March 30th.

Another impressive moderation followed from the morning of the 18th to the afternoon of the 19th: temperatures on the 18th rose over 30 degrees at most sites, and by 36 degrees at the Martinsville 2 SW (Morgan Co.) COOP station; highs rebounded to the 60s on the 18th, before mainly low 80s returned on the 19th. The 20th's mild morning drove the day's overall anomalous warmth, with western sites reporting their highest minimum of the month, including **61F** at the Farmersburg TV-2 (Sullivan Co.) COOP station; mid-80s were common by the late afternoon, with greatest warmth at Martinsville 2 SW, Shoals 8 S, and the Columbus (Bartholomew Co.) COOP station which all hit **86F**; Indianapolis' day ranged from 60F to 84F.

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However, this warmth was short-lived, as another transition to cooler weather occurred on the **21st**, with a 24-hour temperature decrease as great as 23 degrees at Terre Haute.

The remainder of the month featured nine consecutive days below normal which led the so-far mild April to being moderated to near- or only slightly above normal levels. This trend included both unseasonably cool conditions on the **22nd-24th**, followed by a more reasonable chill for late April, before a cooler end to the month on the **30th**. As was seen earlier in April, variations in daily high temperatures set the trend while lows were steadier, varying from mainly the mid-30s to mid-40s through this last week, with freezing temperatures observed on a few mornings. The lowest maximums, near the 45-55F range, included **44F** on the **22nd** at West Lafayette 6 NW, **42F** on the **23rd** at Rockville, and **50F** on the **24th** at several eastern tier sites, including the Greenfield (Hancock Co.) and New Castle 3 SW (Henry Co.) COOP stations; Indianapolis peaked at 54F, 45F, and 54F, respectively, with the very chilly **23rd** maximum coming within 3 degrees of the record low from 1927. Corresponding morning lows on the **23rd** were as low as **31F** at Rockville, and **32F** at some Tippecanoe County stations and Castleton 2 S (Marion Co.). The **24th** brought the region's first widespread freeze since March, with upper 20s common, and even 30F reported by the Seymour 1 WSW (Jackson Co.) CCOOP, while Rockville reported **21F**! Rockville's low was not only a daily record, but also the **latest-ever reading so low in the site's 128-year period**, surpassing 19F on 4/17/2020. The **26th** was April's last cold morning, wherein Lafayette and West Lafayette 6 NW both dropped to **29F**, while **32F** was measured at Farmland 5 NNW and Rockville. Indianapolis' lows on the **23rd**, **24th**, and **26th** were 34F, **28F**, and 39F, respectively; with the **24th**'s minimum tying the **record low** from 1910. Finally, April ended with a reinforcing cool blast on the **30th**, with considerable cloudiness holding highs at most locations to only the low to mid-50s, while West Lafayette 6 NW only reached **45F**, and the NWS Indianapolis office (WFO) peaked at a chilly **46F**.

The frequency of April mornings at or below freezing across central Indiana ranges from normally 3 at Eagle Creek Airpark to 7 at Lafayette, with all other 1st-order sites normally tallying 4 freezing days. April 2023's count was about one day less than normal, with 2 freezes at Shelbyville and Marion County sites, and 7 at Lafayette. Indianapolis tallied 12 days that peaked under 60F -- this was the first time an above-normal April had so many chillier daytimes since 14 such days in 2009. Indianapolis' April 2023 temperatures were only slightly above normal, yet it was the mildest April since the unseasonably mild April 2017. April 2023 was also the mildest in six years at Eagle Creek Airpark, yet most other 1st-order sites observed only their mildest April since 2019 or 2021. At Indianapolis, April 2023's daily average temperatures were above normal on 14 days, below normal on 14 days and at normal on 2 days. Nevertheless, it tied for the **41st warmest** April for the Indianapolis Area since weather records began in 1871, placing it in the **73rd percentile**.

MAY 2023 TEMPERATURES

May 2023 continued April's trend of overall near to slightly above normal temperatures, and marked eight of the past ten months that have finished within ~1 degree of normal at Indianapolis (with the anomalously mild mid- to late winter 2022-23 being the only outliers).

May 2023 did exhibit a noticeable gradient in trends across northern counties, however, with Lafayette finishing 1.7 degrees above normal while Muncie was nearly a degree below the seasonable mark. May's typical moderating trend was exemplified by quite cool conditions on the 1st-4th and early summer warmth on the 28th-31st; in between, milder trends were observed through both the 6th-8th and 12th-14th, while overall slightly below readings through the month's 3rd and 4th weeks were most pronounced on the 20th-21st and 25th-27th. Several lovely late spring days were on display through May 2023, albeit at the expense of increasingly abnormally dry conditions.

The 1st continued the unseasonably chilly trend from the very end of April - highs only reached the mid-40s at several sites, with 43F at Bloomington Indiana U. and Castleton 2 S (which was actually Bob McLain's lowest May maximum in his site's 23-year record); Indianapolis managed 48F which would end up being 9 degrees lower than any other day of the month. Quite cool conditions continued through the morning of the 4th, with minimum readings around 40F gradually trending lower under the decreasing cloud trend; nearly all sites dropped into the 30s for at least one morning, the Farmland 5 NNW (Randolph Co.) COOP station's 32F on the 4th was the region's lone freeze for the month, while 33F was also observed at Rockville on both the 3rd and 4th and at the New Castle 3 SW (Henry Co.) COOP station on the 4th, Indianapolis respective lows were 40F and 38F. Considerable cloudiness held Muncie to 57F or lower through the 3rd, leading 4 consecutive days at least 10 degrees below normal - this more pronounced early-month trend contributed to the site's below normal monthly average.

A milder trend surrounded the month's first weekend over the 6th-8th, with lows often around 60F and highs in the mid-70s to low 80s; the 7th brought the warmest afternoon for most locations, with 81F reported at Lafayette, Muncie, and COOP stations at West Lafayette 6 NW (Tippecanoe Co.) and Kokomo 3 WSW (Howard Co.), 81F appeared again on the 8th at two other COOP stations - Shoals 8 S (Martin Co.) and Vincennes 5 NE (Knox Co.); Indianapolis reached 79F and 76F, respectively. Unseasonably mild mornings then drove an even warmer trend through May's second weekend on the 12th-14th: lows in the 60s were highest on the 13th when Shoals 8 S only fell to 70F, and 68F was observed at both the Washington 1 W (Daviess Co.) and Farmersburg TV-2 (Sullivan Co.) COOP stations; Indianapolis' minimums of 66F on both the 12th and 13th were matched on the 31st for the highest of the month. Every reporting site hit the low to mid-80s for at least one day through this warmer stretch, with 85F reached at both the Tipton 5 SW (Tipton Co.) COOP station on the 12th, and Vincennes 5 NE on the 13th; Indianapolis peaked at 79F and 83F, respectively.

Following several days with near-normal temperatures, a brief cooler period arrived for the month's third weekend: highs were lowest on the 20th, generally in the mid-60s to around 70F despite ample sun, due to the, at times, robust north-northwesterly breezes; only 63F was managed at both Farmland 5 NNW and Kokomo 3 WSW, while Indianapolis reached 67F. The following morning (21st) brought widespread 40s to the region, with lowest readings 39F at Rockville and 40F at Farmland 5 NNW; Indianapolis dropped to 46F. Perhaps more noteworthy on the 21st were impressive diurnal temperature ranges, as great as 40 degrees at Rockville, while the Crawfordsville 6 SE (Montgomery Co.) COOP station rose 36 degrees, to a high of 77F. The start of the late month dry pattern on the 22nd-24th exhibited lovely late spring weather with days running from cool, crisp early mornings in the 50s to warm afternoons in the 80s.

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The 25th-27th brought continued dry, yet slightly cooler weather lead by fresh east-northeasterly breezes that only allowed 70s for highs; coolest mornings were at Rockville (41F on the 25th) and Farmland 5 NNW (42F on the 26th); Indianapolis recorded lows of 50F and 49F, respectively.

Central Indiana finally had a taste of early summer through May's final days, as light southeasterly winds allowed for a steady increase of warmth and light to moderate humidity over the 29th-31st. First-90F's were hit at Shelbyville on the 29th, the Perrysville 4 WNW (Vermillion Co.) COOP station on the 30th, and several other sites on the 31st: Lafayette, Muncie, Terre Haute, Farmersburg TV-2, and Rockville; Indianapolis respective highs were 86F, 85F and 88F. Low temperatures meanwhile trended through the 50s to the low to mid-60s by the 31st, with highest reported daily minimums on the 31st of 66F at Indianapolis and 65F at Farmersburg TV-2. Readings trending warmer along the Wabash Valley during these several final days made the difference for Lafayette's monthly average temperature landing ~1 degree higher than other 1st-order sites.

Following the very mild May 2022, **May 2023** was the second warmest at Indianapolis since the all-time hottest - May 2018; yet at Muncie it was the third coolest May of the last six years. Indianapolis recorded a unique distinction this spring: as it was only the second year of the modern era to reach 80-84F on as many as 12 days, yet not hit 85F until May 29th (13 days later than normal). 1st-order sites that hit 90F in late May were about 1 week ahead of schedule, with their respective normal first-90F dates ranging from June 3rd at Shelbyville and Terre Haute to June 10th-11th at Muncie-Lafayette. Indianapolis' normal first-90F is on June 19th. At Indianapolis, May 2023's daily average temperatures were above normal on 18 days and below normal on 13 days. It was the 48th warmest May for the Indianapolis Area since weather records began in 1871, placing it in the 69th percentile.

Spring 2023 Temperature Data for Central Indiana Sites

Site	Spring 2023 Av Temperature	Spring Season Normal Temp	Difference From Normal
Indianapolis Int'l Airport	53.6	53.2	+0.4
Lafayette	51.9	50.9	+1.0
Muncie	53.1	53.2	-0.1
Terre Haute	54.0	53.6	+0.4
Bloomington	54.0	53.8	+0.2
Shelbyville	55.2	54.3	+0.9
Indianapolis Eagle Creek	53.5	53.3	+0.2

Spring 2023 Temperature Extremes Across Central Indiana

Site	Highest Temperature	Lowest Temperature
Indianapolis Int'l Airport	88 on 5/31	17 on 3/19
Lafayette	90 on 5/31	14 on 3/18, 3/19
Muncie	90 on 5/31	16 on 3/19
Terre Haute	90 on 5/31	19 on 3/18
Bloomington	88 on 5/31	15 on 3/19
Shelbyville	91 on 5/29, 5/31	18 on 3/19
Indianapolis Eagle Creek	88 on 5/31	19 on 3/18, 3/19

Precipitation

MARCH 2023

March 2023 continued the recent multi-month cycle that trended from a consistently dry fall 2022, into a near to slightly-above normal winter, to now a very wet start to spring 2023. Precipitation was frequent and at times anomalous, with heavy rainfall events through both the first and last weeks, several days of widespread snow showers through the mid-month, and several other light to moderate rains. Any remnant drought concerns were replaced by two rounds of widespread river flooding, with late month flooding being the region's worst in over 3 years. Despite copious rainfall during the 3rd and 23rd-24th, the combined sum from these heaviest events still only accounted for 60-70% of monthly totals for most locations given the damp pattern through the rest of the month; although the greater rainfall in these two episodes across southern locales yielded ~80% of the month's total at both Bloomington and Shelbyville.

The February 28th U.S. Drought Monitor update (released March 2nd) showed a relatively small patch of "Abnormally Dry" (D0) conditions remaining in southeastern Indiana, including portions of eastern Jackson County and most of Jennings County. Meanwhile, minor river flooding that had begun in late February continued into March on the Wabash River from Lafayette to Riverton.

A very strong late winter storm system on the 3rd deepened while tracking from the mouth of the Ohio River into far southern central Indiana (see Miscellaneous and Severe sections below regarding record low barometric pressure and damaging winds). Moderate to heavy rainfall quickly spread northward pre-dawn on the 3rd, with often heavy precipitation continuing during the day before tapering off from south to northeast in the evening. 27-hour storm totals

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exhibited the usual north-south gradient with generally **1.40-2.50"** across the region's northern half, and **2.15-3.15"** over the southern half, with embedded greater amounts in far south-central zones, including **3.47"** at Buddha (Lawrence Co.) and **3.45"** at Shoals 8 S. The gradient was distinct across the Indianapolis Metro, from as little as **1.56"** on the north side of Carmel (Hamilton Co.) to as much as **3.15"** in Greenwood (Johnson Co.). It was the month's wettest day at all 1st-order airports (see table below); as well as the wettest single day since 7/11/2017 at Eagle Creek Airpark, and since 7/1/2021 at Indianapolis. Indianapolis recorded its 11th wettest March day (a 14-year return period), while Terre Haute saw its 13th wettest March day (a ~10-year return); both Shelbyville and Eagle Creek Airpark observed their wettest March days within their relatively short records (since 1999). The potent storm brought mixed precipitation by early evening across northern counties, with the West Lafayette 6 NW observer noting "multiple transitions from rain to sleet to snow and back amid very high wind". A complete changeover to wet snow followed along and north of I-70 as precipitation rates tapered off, with a rather narrow band of maximum **1.0"** reports from the Pence 1 SW (Warren Co.), Lafayette 8 S and Kokomo 3 WSW (Howard Co.) COOP sites. Several ~0.5" observations were otherwise found near I-65 northwest of Lebanon (Boone Co.), while measurable snow reached as far southeast as the northern Indianapolis Metro, and flakes were observed down to eastern Owen Co., although all snowfall was fast to melt.

Widespread river and smaller basin flooding followed. Four of the smaller basins that started flooding on the **3rd** – the Mississinewa River at Ridgeville (Randolph Co.), Beaver Creek at Shoals (Martin Co.), North Fork Salt Creek at Nashville (Brown Co.), and Youngs Creek at Amity (Johnson Co.) all reached **moderate flood** between late day on the **3rd** and the evening of the **4th**, with moderate flood lasting at Ridgeville for over 26 hours. East Fork White River's flooding ended quickly above Seymour, with all points down to Columbus falling out of flood by pre-dawn on the **6th**. Same was the case on upper portions of the White River where the four of the six sites that flooded (for generally less than a day) through Centerton, all receded by the evening of the **5th**. With the exception of Wildcat Creek at Lafayette's 2.7 days of flooding ending on the afternoon of the **6th**, all main Wabash River points continued in flood through the **7th**, following the Wabash at Lafayette reaching **moderate flood** from late evening on the **4th** through late morning on the **6th**.

Several days of mainly rain-free conditions followed the **3rd**'s storm in what would be the month's only organized dry period before a more active trend took shape across the region. The March **7th** drought update finally removed **D0** from all of, not only Indiana, but essentially all territory between the Mississippi River and Appalachian Mountains, sans southeastern Michigan. This was the first time without any drought intensity anywhere in the state of Indiana since 5/17/2022. Ongoing river flooding on the East Fork White River transitioned from upriver to downriver sites, with flooding slowly starting across Lawrence County portions from the **6th** to the **8th**, while nearly 4 days of minor flooding ended at Seymour late on the **7th**. Next, middle portions of the White River fell out of flood: at Spencer late on the **7th**, and at both Elliston and Newberry pre-dawn on the **9th**.

The next system on the 9th brought heavy snow to the Upper Midwest and light accumulations just north of central Indiana, yet only a light rain (generally 0.10-0.25") fell across the local region. The 10th was a drizzly day with a mixture of at least brief light snow across several northern zones and the Indianapolis Metro. The overnight spanning the 11th-12th saw a light rain to snow event that dropped ~1-3" on northeastern counties, while ~0.5-1.5" or so was common along the Metro's northern and western areas outside of the inner-city's heat island, with 0.6" Indianapolis' official observation. The 12th's mainly evening flurries and embedded snow showers brought an additional dusting from Frankfort (Clinton Co.) to Clermont (Marion Co.). The 13th's widespread flurries included ~0.5" from snow showers near and east of Muncie, and a prolonged snow shower/squall that brought ~0.4-0.8" along an axis from east of Crawfordsville down to North Vernon, with a quick 1.8" observed at the Danville 3 SW (Hendricks Co.) COOP site, while the band actually caught the southwestern Metro, bringing 0.7" officially to Indianapolis, as observed at the NWS office, the thick coating covering freshly arrived tufts of green grass that arrived on the heels of the very mild late-winter.

Despite the additional light precipitation, ongoing minor river flooding ended on the East Fork White River at Williams, Bedford and Rivervale throughout the 10th; and along the Wabash River at Lafayette on the 10th and Covington on the 11th (after 15 days in flood), before both Montezuma and Terre Haute followed on the 13th (ending ~17 days of flood at Montezuma); and along the lower White River - at Edwardsport on the 10th, and after 9 days at both Petersburg and Hazleton (on the 13th and 14th, respectively). The Wabash at Mount Carmel returned to its banks on the 15th, with Vincennes and Riverton following suit on the 16th and 17th, respectively (concluding 18 days in minor flood at Riverton).

The 16th brought mainly light rain through PM hours and into early on the 17th, with as much as 0.50-0.65" over west-central counties and eastern Greene County, with most of the Indianapolis Metro picking up ~0.20-0.40". Soon after, snow showers pre-dawn on the 18th brought a thin coating to most central and northern counties, with greater accumulations north of Lebanon, including 1.0" reports spanning the Lafayette and Kokomo areas, and as much as 1.5" observed in Burlington (Carroll Co.). Additional flurries and a few snow showers through dawn on the 19th brought additional 1-day snowfall as great as 1.0" in Carmel, with measurable snow as far south as 0.2" east of Mitchell (Lawrence Co.). 2-day snow totals of 0.3-1.1" were common across the region's northern half, with Indianapolis officially observing 0.2".

Heavier rains and associated flooding returned for the late month. Widespread light rain through the 21st's PM hours was a prelude to the main barrage. Scattered showers during the 22nd daytime brought as much as 0.83" in Riley (Vigo Co.), before a heavier band of rain set up along the region's northern tier pre-dawn on the 23rd, bringing locally as much as 1.36" in northwestern Tippecanoe County, and 1.10" as far east as the northern side of Muncie. Scattered showers with embedded downpours continued through the 23rd, with heavier rains trending from central to southern zones during the day. Organized moderate to heavy rain rates then developed in the evening near and south of the Interstate 70 corridor, with 1-day totals through dawn on the 24th mainly 1.75-2.75" over the region's southern half, with 3.16" in Scipio (Jennings Co.) and 2.70" on the south side of Shelbyville; farther north found around 1.00" across much of the Indianapolis Metro, and generally less than 0.50" across the region's northern tier. 2-day totals through dawn on the 24th ranged from ~0.60" between Lebanon and

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Crawfordsville, to ~1.50" in the Lafayette area, to several southern counties approaching 3.00". After a respite during the 24th's daytime hours when rain was restrained to light to moderate rates across mainly southern zones, a final overnight deluge fell over mainly southern counties, with late night rains also reaching northern zones. Additional 1-day totals through dawn on the 25th ranged from 1.00-2.00" across south and east counties while many 0.50-0.90" observations came from northern and western zones, with 2.08" in Edinburgh (Johnson Co.), 2.05" in Fairland (Shelby Co.), and 2.03" at the Vincennes 4 E COOP site (Knox Co.). 3-day totals through dawn on the 25th showed a very tight north-south gradient that ran from just north of Terre Haute, to southern portions of the Indianapolis Metro, with a broader gradient over eastern counties between Muncie and Rushville: 1.30-2.40" prevailed to the north and west while 3.20-4.20" was the rule for central Indiana's southern half; greatest totals of ~4.40" and greater were found in embedded west-east bands that were captured by three COOP stations: 4.89" at Franklin WWTP (Johnson Co.), 4.53" at Washington 1 W (Davies Co.), and 4.45" at Vincennes 4 E. The Indianapolis Metro was on the transition between heavy and anomalous rainfall, with as little as 1.33" in Westfield (Hamilton Co.) to 3.88" southeast of Greenwood. The most anomalous 2-day rainfall totals through dawn on the 25th were Martinsville 2 SW's 3.66" (greatest in the 101-year record), and Shelbyville WWTP's 3.98" (a 32-year return), while ~25-year returns were recorded by Franklin WWTP's 4.65", Spencer's 3.79", and Rushville's 3.50".

Understandably, widespread river and smaller basin flooding returned to central Indiana. With the exception of the White River from Noblesville to Indianapolis, all main stem river points entered minor flood; generally starting between late day on the 24th and the morning of the 25th, later to start were the lower-most portions of the Wabash River and upper parts of the White (late on the 25th), and then the Lawrence County portions of the East Fork White River (from late on the 26th to late on the 27th). **Moderate flooding** also returned to several gages: the Mississinewa River at Ridgeville for over 18 hours on the 25th, Youngs Creek at Amity for 11 hours late on the 25th, East Fork White River at Seymour for nearly **2.5 days** from late morning on the 25th through the 27th evening, the Driftwood River near Edinburgh for 9 hours on the 26th, the White River at Newberry (which crested at moderate flood stage pre-dawn on the 28th), and at Edwardsport for 16 hours through noon on the 29th.

Very light scattered showers lingered through the morning of the 25th. A weaker wave crossing the Midwest then brought less intense rains from the evening of the 26th into the morning of the 27th, with a general 0.10-0.50" across central Indiana, while most of the Indianapolis Metro saw the greatest amounts around ~0.50". 5-day rainfall totals for the 23rd-27th at 1st-order airports ranged from 2.16" at Muncie to 3.46" at Shelbyville and 3.50" at Bloomington, while Indianapolis reported a plentiful 2.61".

Once-widespread flooding was fairly quick to recede for at least half of the region's river/creek points. Minor flooding first ended on the upper White through Centerton and upper-most portions of the East Fork White by the 26th. The 29th found the White at Spencer ending over 4 days of flooding around dawn, and the East Fork White receding to its banks down to Seymour by early evening. Flooding then ended on both the White at Elliston and the Wabash

River at both Lafayette and Covington by late on the **30th**. Meanwhile, **moderate flooding** had begun on the White at Petersburg very early on the **30th**; and soon after, the crest of runoff from the entire region, flowing through the Wabash at Mount Carmel, reached **moderate flood** pre-dawn on the **31st**. Minor flooding would continue into April 2023 on the E. Fork White from Rivervale and downriver, on the White from Edwardsport and downriver, and much of the Wabash - from Montezuma on down.

The rainy pattern continued through March's final days with light to moderate rains overnight on the **30th-31st** totaling mainly 0.10-0.45", with greatest amounts in east-central counties. A couple rounds of scattered showers continued during the **31st** daytime with additional, mainly light rainfall amounts, although ~0.50" more fell across much of the region's southern tier. More notable was the next, and month's final, reiteration – strong showers and severe storms during the **31st**'s late evening (see Miscellaneous and Severe sections below), which, despite their fast storm motion, were able to drop locally up to an additional **~1.00"**. 2-day totals to end the month were generally 0.40-**1.40"**, yet with high variability from the downpours that tracked along the southern side of the I-70 corridor, across the upper Wabash Valley and through northwestern portions of the Indianapolis Metro yielded: **1.39"** in Clay City (Clay Co.), **1.55"** near the junction of Hancock, Rush, and Shelby Counties, **1.40"** in far north-central Tippecanoe Co., and **1.94"** southwest of Westfield (Hamilton Co.).

Overall, March 2023's precipitation was well above normal, with monthly totals around **5.00"** common north of I-70, while most southern locations accumulated around **8.00"**. Isolated remnant drought conditions over southeastern Indiana ended following the **3rd**'s soaking rain. It was the wettest March for the Terre Haute area since 1973, the all-time (since 1999) wettest at Eagle Creek Airpark, wettest (since 2007) at Muncie, tied 2008 for the wettest on record (since 1999) at Shelbyville, and was the wettest at Indianapolis since 2008. Bloomington and Shelbyville's 1st-order sites (both with a 25-year period of record) each observed just over 2.00" on the **24th**; giving Bloomington's record five 2.00"+ days in March (two of which occurred this year), and Shelbyville's record only three such March days (all occurring in 2023, excepting 3/23/2012). While less extreme, Muncie's 1.09" on the **31st** gave the site three 1.00"+ days in March 2023 - the only such March occurrence in the airport's 61-year period; (although March 2006 came close with daily totals of 1.33", 1.50", and 0.86"). Also noteworthy was the frequency of days with light rainfall: 1st-order airports normally record 11-12 March days with measurable (0.01"+) precipitation and 6-7 March days with 0.10"+; Eagle Creek Airpark observed these thresholds on 16 and 12 days, respectively, as did Terre Haute on 15 and 11 days, Indianapolis' respective tallies were 16 and 10 days. For local COOP stations, it was the wettest March in Franklin WWTP's 30-year record (**8.30"**), and the 4th-wettest March at Martinsville 2 SW (**7.54"**, a 25-year return), as well as the site's wettest March since 1963. A 15-year return was recorded at Rushville (**7.28"**) and the Shelbyville WWTP (**7.63"**), with both sites having the wettest March since the 1960s; while Elnora (**7.30"**) and Graysville 5 WNW (**7.17"**) both recorded the wettest March in their 15-year records. Greenfield measured the 9th wettest March in their 119-year record, and also the rainiest since 1964. Indianapolis' precipitation over the last 12 months improved to 37.05" (now only 6.58" below normal, yet still ~15" below the preceding April-March); while Indianapolis' water year to date (October 2022–March 2023) precipitation, 18.02", recovered substantially to 96% of normal. The 2023

MARCH 2023 PRECIPITATION (Con't...)

year-to-date total at Indianapolis nearly doubled to **12.55"**, a staunch **3.31"** above normal. March 2023 saw the greatest expanse of **moderate flooding** in over three years, since 11 gages reached moderate in January 2020. Frozen precipitation exhibited a strong north-south gradient as is often found in March, with monthly totals of mainly 2-4" across the region's northern half, while a dusting to 0.7" was found south of the Interstate 70 corridor. Indianapolis' **1.5"** was a fair representation of the Metro's range (from 2.1" in Carmel to under 0.5" across Johnson and Hancock Counties), although the **13th**'s snow squall led the **3.6"** sum at Danville 3 SW. Leading the whole region were **4.3"** at Kokomo 3 WSW and **4.0"** at the Muncie WWTP.

March 2023 was the **21st wettest** March in the Indianapolis Area since weather records began in 1871, placing it in the **86th percentile** for precipitation of all recorded Marchs. This exemplified both the wetter trend observed since January 2023, as well as the now 8 consecutive year streak of wetter than normal Marchs.

APRIL 2023 PRECIPITATION

April 2023 took a subtle step back from the general pattern of precipitation recovery that was seen over the preceding four months (led by January and March 2023's above normal precipitation). Despite numerous light to moderate rainfall events, the lack of any widespread heavy rainfall episodes held monthly totals below normal, continuing the overall dry pattern of the past 12 months. The month's first two weeks trended from significant rains on the **5th** to an extended dry period, that allowed remnant river flooding from March to end. Latter portions of April found occasional scattered or numerous rain showers and even a few northern snow showers on the **17th**, prior to more organized, yet moderated rains to end the month.

River flooding continued as April began along portions of the region's three main stems. The East Fork White River had crested in the final days of March, yet minor flooding continued through Lawrence County points and down to Shoals; the lower White River remained in minor flood along Knox County, with its slow crest passing Hazleton through the **1st**, nearly 9 days of flooding ended at Edwardsport that afternoon. The Wabash River continued in minor flood from Montezuma through all downriver points, except at Mount Carmel where ongoing **moderate flooding** crested pre-dawn on the **1st**. The system that spawned violent and deadly storms over the region during March's final hours lingered into April **1st**, dropping scattered light rainfall over eastern counties pre-dawn before additional light convective afternoon rain showers fell amid windy conditions (see Miscellaneous section below). Upper portions of the Wabash then returned to minor flood, starting at Lafayette late on the **1st** and then at Covington early on the **2nd**; flooding meanwhile ended after 4-7 days along the aforementioned portions of the East Fork White, from late evening on the **1st** through the morning of the **2nd**.

The White River at Edwardsport entered flood once again through the overnight of the **2nd**. Areas of rain fell across southern counties through both AM hours on the **3rd** and then pre-dawn on the **4th** across several southern counties, with no reports exceeding 0.45". The prolonged Wabash River flooding improved through April's first week: Mount Carmel fell out of

moderate flood late evening on the 2nd, and the river receded into its banks at Vincennes by the afternoon of the 4th. The April 4th U.S. Drought Monitor update (released April 6th) continued to show no drought intensity over any part of Indiana, and essentially no drought concerns between the Mississippi River and Appalachian Mountains.

The 5th then brought the month's greatest precipitation event to most locations, courtesy of a widespread soaking rain throughout the daytime hours, including heavier afternoon rains across the region's southeastern half; event totals ranged from around 0.50" over the Upper Wabash Valley to several **1.50-1.80"**+ reports along the US-50 corridor, led by **2.61"** east of Shoals (Martin Co.), while **1.55"** was measured as far northwest as Freeman (Owen Co.). Despite the lighter rains across northern counties, river flooding ended after ~3 days at Lafayette/Covington on the 4th/5th, while longer duration minor flooding continued to wane farther down the Wabash.

Upward trends in discharge, however, occurred farther south, with smaller basins the first to respond: minor flooding started late day on the 5th along both Brush Creek at Nebraska (Jennings Co.) and Beaver Creek at Shoals (Martin Co.); Brush Creek would return to its banks by late evening, yet Brush Creek at Shoals crested close to **moderate flood** around midnight, and continued to flood through the afternoon of the 6th. A few main stem points that had recently returned to their banks re-entered minor flood for an additional 1-3 days – on the Wabash River at Vincennes, East Fork White at Seymour, and White River at Edwardsport, all starting on the 5th-6th. Ongoing river flooding elsewhere across southern zones was prolonged by the rain -- what had been slowly falling flood stages at several points were abruptly replaced by rising flood waters. The East Fork White at Rivervale also eventually returned to flood from late evening on the 8th through the morning of the 10th.

The month's second week was mainly dry – bringing the region's longest break from measurable precipitation since early February. The ongoing river flooding had subtle secondary crests, on the Wabash at Vincennes on the 6th, and on the White along Knox County on the 7th-8th. The spring 2023 river flood season came to an end soon after: on the middle Wabash at Montezuma down to Riverton on the 6th-9th, at Mount Carmel early on the 11th; and on the lower White, late on the 12th at Petersburg and on the morning of the 13th at Hazleton. This concluded ~16 days in flood at both Riverton and Mount Carmel, and over 20 days of flooding at Hazleton.

The latter portions of April included several, generally light to moderate precipitation events. The 14th brought scattered PM showers from western portions of the Indianapolis Metro through several southern counties, with small-scale embedded downpours that totaled as much as 0.51" east of Martinsville (Morgan Co.) and 0.46" in Avon (Hendricks Co.). Numerous light showers on the 15th led to widespread post-cold frontal light rain on the 16th, with the greatest 2-day precipitation total report through dawn on the 17th of only 0.45" in Plainfield (Hendricks Co.), while most locations observed less than half as much. The precipitation transitioned to late season snow showers for the northern half of the region during mainly AM hours on the 17th; the only measurable snow reports were **0.1"** pre-dawn in Carmel (Hamilton Co.) and **0.2"** that was measured at Kokomo 3 WSW during the day; frozen precipitation was

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reported in Marion County as far south as Castleton 2 S and Speedway, with no snow officially observed at Indianapolis.

The next storm system slowly deepened over the Upper Midwest, gracing northern portions of central Indiana with light warm frontal rains early on the **20th** ... before a steady period of mainly light to moderate rain gradually crossed the region from late day on the **20th** through the night of the **21st**, with rain falling for no more than ~18 hours on any one location; rainfall through dawn on the **21st** was greatest under embedded Wabash valley thunderstorms with **1.21"** in Covington (Fountain Co.) and as much as **1.03"** in the Lafayette area; storm totals elsewhere were generally 0.35-0.75" with several isolated pockets of heavier rain, including **1.28"** in Bowling Green (Clay Co.). The **22nd** found a few rain showers on the back side of the departing system, with embedded graupel north and west of Indianapolis.

April's final days included two moderate rainfall events for central and eastern zones, which helped to bring the month's lackluster precipitation closer to normal over most of the region. Rains through the **27th** overnight, excepting the region's northwestern quadrant, totaled mainly 0.30-**1.05"**, with **1.35"** reported in Rushville (Rush Co.) and **1.10"** in Columbus. The **29th**'s afternoon/evening showers and thunderstorms were followed by lighter late-night rains that, by dawn on the **30th**, totaled mainly 0.15-0.75" with heavier pockets in the vicinities of both Bloomington and Muncie, while a rogue report of 0.94" in Waldron (Shelby Co.) led all observations. Several reports of brief, small hail at the onset of the **30th**'s afternoon showers were received from the Lafayette to Indianapolis areas; the NWS WFO observed a few pea-sized hailstones, yet given none observed at the International Airport 1.3 miles to the north, the official Indianapolis record had no frozen precipitation. Widespread, generally light rain continued through the **30th**, with reports of an additional 0.10-0.40" through early on May 1st. 4-day totals to end the month ranged from around 0.40" north and west of Crawfordsville, to widespread 0.75-**1.80"** observations over most other locales, with embedded higher reports: **2.29"** at the Muncie Airport and **2.17"** in Rushville. Most 1st order sites picked up 24-38% of their monthly total in these final four days of the month, although Muncie recorded 63% of their April sum.

April 2023's precipitation would have been generally adequate for a winter month, yet was below normal to well below normal for April - only a few small areas had near **4.00"**, while a solid majority of the region accumulated only 1.60-3.30" from the numerous light to moderate rains. Nevertheless, central Indiana avoided any reappearance of drought intensity through the April **25th** update. It was only the driest April for most 1st-order airports since recent years (2020-2022), although Terre Haute's 1.91" marked the station's driest since 2008. Local COOP stations followed a similar pattern, with most recording the driest April since only 2020 or 2021, although Farmersburg TV-2 (2.38") and Vincennes 5 NE (2.83") both observed their **driest April since 2004**, Elnora's (2.93") was the station's driest since 2010, and the least precipitation since 2010 was reported from Frankfort Disposal, Tipton 5 SW, and both West Lafayette sites. Indianapolis' precipitation over the last 12 months deteriorated to 34.92", which is 8.71" below normal, nearly 18" below the preceding May-April's sum, and yields the driest such period in 23 years. Indianapolis' water year to date (October 2022-April 2023) precipitation, 20.31",

decreased to 88% of normal. The 2023 year-to-date total at Indianapolis (driven by the very wet March) rose to **14.84"**, **1.26"** above normal. April 2023's river flooding saw a transition from numerous sites in minor flood on the **1st** to the conclusion of all spring-season river flooding by the end of the second week, following what was a second crest at many sites courtesy of the **5th**'s significant rains; only minor flooding was observed, except for the Wabash at Mount Carmel, where 2.7 days in **moderate flood** ended on the late evening of the **2nd**. Frozen precipitation was limited to (mainly unmeasurable) snow showers on the **17th**, isolated graupel on the **22nd**, and brief, small hail on the **30th**; although none of April's frozen precipitation fell south of the I-70 corridor. April 2023 was the **35th driest** April in the Indianapolis Area since weather records began in 1871, placing it in the **23rd percentile** for precipitation of all recorded Aprils. This contrasted both the copious rains of March 2023, as well as 8 of the last 10 Aprils which were all above normal.

MAY 2023 PRECIPITATION

May 2023 continued the dry trend that began in April. Despite strides made through the wet start of 2023 to counter what had been a dry end to 2022, the normally wet May finished 2-3" below seasonable levels across much of the region. Indianapolis' 2.84" was not enough to keep the city's annual precipitation total from falling below normal. A few, mainly light to moderate rainfall events prevailed through the first three weeks, before a prolonged late month dry period. The summery pattern seen in May's final days promoted isolated downpours that did little to improve the trend of the preceding two months. May was devoid of main stem river flooding, while a few smaller rivers/streams did overrun their banks on the **7th-8th**, and **13th**.

The month started with light rain on the **1st** bringing 0.20-0.50" along and north of the I-74 corridor. The May **2nd** Drought Monitor update (released on May 4th) showed drought intensity returning to parts of the central Indiana region for the first time since February 28th: the **Abnormally Dry** conditions (**DO**) that were enveloping much of central Illinois as May began also reached farther east to all of Parke and Vermillion Counties, as well as much of Fountain, Vigo, and Warren Counties.

Several rounds of scattered to widespread showers and thunderstorms crossed the region on the **6th-8th**, with the majority of rain falling through AM hours on the **7th**; greatest multi-day rainfall totals were **2.55"** east of New Ross (Boone Co.), **2.42"** east of Traders Point (Marion Co.), with several other **2.40-2.46"** reports through Vigo County; the greatest 1-day observations through dawn on the **7th** were **2.08"** west of New Goshen (Vigo Co.) and **2.05"** in Augusta (Marion Co.). Non-main stem river flooding followed on the **7th** for ~4 hours through dawn on Prairie Creek at Lebanon 5 NW (Boone Co.), and (following an elevated low-action stage since April 15th) on Salt Creek at Harrodsburg (Monroe Co.) for ~16 hours during the **7th** into very early on the **8th**. The Mississinewa River at Ridgeville meanwhile crested just shy of flood stage late in the day. The May **9th** drought update indicated **DO** retreating slightly over the western Midwest, with only small portions of Fountain, Vermillion, and Warren Counties still included. Dry conditions prevailed on the **9th-11th**.

MAY 2023 PRECIPITATION (Con't...)

The 12th-16th included several rounds of numerous to widespread rain showers that were nonetheless generally underperforming, with most of the region accumulating only 0.30-1.00" over the 5 days. Several rounds of isolated heavy rains crossed the region on the 13th: a morning band of torrential rains through the northeastern half of Randolph County brought 3.34" between Winchester and Union City, thunderstorms continuing during the day from Tippecanoe to Henry County produced up to 1.25" in Anderson (Madison Co.), before afternoon and overnight rains from western portions of the Indianapolis Metro down to Lawrence County dropped 1.29" in Clayton (Hendricks Co.), 1.79" northeast of Freeman (Owen Co.), and 1.63" south of Unionville (Monroe Co.). The Mississinewa River at Ridgeville flooded for nearly 15 hours on the 13th, including 5.5 hours in moderate flood around the early evening crest. 5-day rainfall extremes ranged from 3.37" east of Winchester, 2.71" near Needmore (Brown Co.), and a couple 1.88" observations in Lawrence County, to no rain at all from Burlington (Carroll Co.) and across parts of Howard County. The very small nugget of D0 west of Covington stayed status quo through the May 16th drought update.

The 19th's mainly evening showers and storms dropped a solid drink over most of the Indianapolis Metro and points south and east, with the widely scattered heaviest rains totaling up to 1.53" southwest of Greensburg (Decatur Co.), 1.48" in Irvington (Marion Co.), and 1.25-1.45" at several spots in southeastern Owen County; pockets of sub-0.20" observations were also found in west-central counties and immediately southwest of Bloomington. The May 23rd drought update brought another move of D0 as it expanded again into northwestern central Indiana, including all locations immediately along and west of the Wabash River down through Vigo County.

A longer dry period was observed from dawn on the 20th through noon on the 30th with no rain reported except for the region's far southeastern corner. This was the longest dry duration for nearly all of the region since a 10-16-day stretch that spanned late September and early October 2022. The transition to an early-summer pattern at end of May was immediately followed by isolated to scattered thunderstorms on the 30th-31st, which found a fast inch or so of rain under the strongest cells, while most of the region remained dry; Williams Dam (Lawrence Co.) boasted the greatest reports on both days -- 1.53" on the 30th and 1.31" on the 31st, while 1.08" was measured south of Seelyville (Vigo Co.) on the 31st. Perhaps more noteworthy were the very strong gradients in rainfall promoted by the fast-forming, yet slow-moving cells: not 3 miles west of the 1.08" report, the Terre Haute Airport measured only 0.05"; likewise 0.70" fell at the NWS office, yet 1.3 miles north the Indianapolis Int'l Airport measured only half this amount, also the two Franklin (Johnson Co.) COOP sites measured 0.70" and 0.18" despite being barely 2 miles apart. The Williams 3 SW (Martin Co.) COOP site's modest 0.30" two-day total was a whopping 2.54" less than Williams Dam's abundant rain only 3 miles to the northeast. The May 30th drought update showed D0 expanding across almost all of central Indiana, although most of Henry and Randolph Counties, and portions of several far south-central counties remained out of any drought intensity. D0 or greater had not covered this much of the central Indiana region since the January 10th, 2023 update.

May is normally Indianapolis' second wettest month (behind June), yet May 2023's rather infrequent and often lackluster rainmakers brought less precipitation than a typical winter month to most of the region, with 1.50-3.50" common across much of central Indiana. Several of the 1st-order airports (see table below) intercepted smaller regions of greater (3.00-5.50") rainfall -- which aligned with parts of the Indianapolis, Terre Haute and especially Bloomington areas -- yet tallies at these airports still fell at least one inch short of normal. While central Indiana avoided any organized reappearance of drought intensity through the May 23rd update, abnormally dry conditions west of the Wabash Valley finally overtook most of the region just before month's end. For most sites it was only the driest May since 2018 or 2021, although Shelbyville's 1.60" was the station's lowest for May since records began in 1999. Reviewing Local COOP stations, it was the driest May since 2007 at Frankfort Disposal, Franklin WWTP, Perrysville 4 WNW and Shelbyville Sewage; while greatest COOP totals included **4.09"** at Spencer and **3.96"** at Shoals 8 S. Indianapolis' precipitation over the last 12 months further deteriorated to 33.99", which is 9.64" below normal, nearly 19" below the preceding June-May's sum, and continues to yield the driest such period in 23 years. Indianapolis' water year to date (October 2022–May 2023) precipitation, 23.15", decreased again to 83% of normal. The 2023 year-to-date total at Indianapolis (led by the very wet March) rose to **17.68"**, yet fell below normal by **0.65"**. No main stem river points flooded in May, although the Wabash River did reach action stage from Lafayette down to Montezuma for both ~3 days around the **8th-11th**, and another ~2 days within the **14th-17th**; while action stage along the White River was limited to Elliston down to Edwardsport, mainly within the **8th-10th**. May 2023 was the **50th driest** May in the Indianapolis Area since weather records began in 1871, placing it in the **33rd percentile** for precipitation of all recorded Mays. This amplified both the below normal rainfall trend seen in both 2021 and 2022, as well as dry trend that began in April 2023.

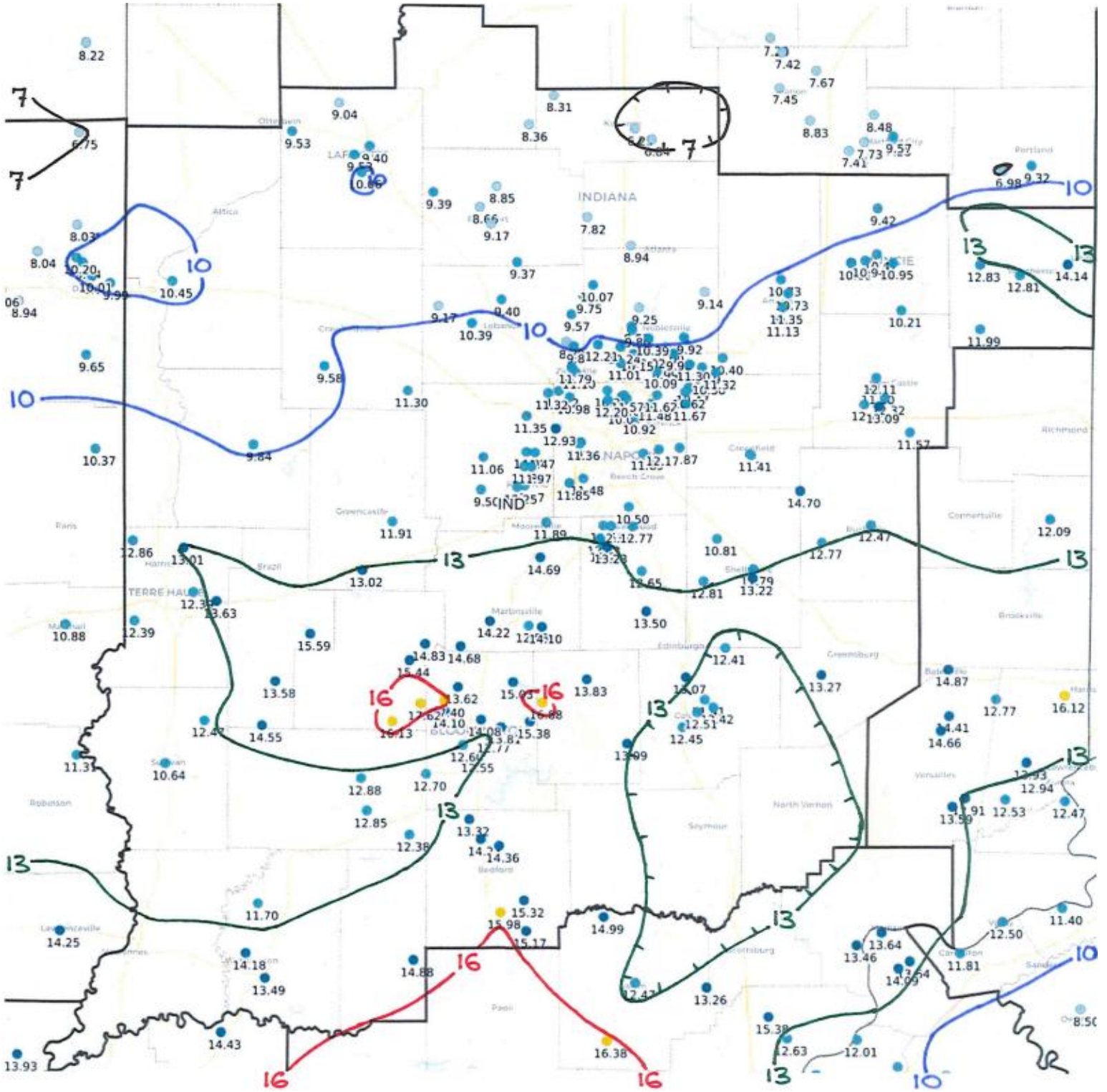
Spring 2023 Precipitation Data for Central Indiana Sites

Site	Spring 2023 Precipitation	Spring Season Normal Precip	Diff. From Normal	Greatest Daily Precipitation
Indianapolis Int'l Airport	11.16	12.78	-1.62	2.24 on 3/3
Lafayette (*)	6.56INC	10.61	M	1.84 on 3/3
Muncie	10.42	11.33	-0.91	2.16 on 3/3
Terre Haute	12.22	12.34	-0.12	2.10 on 3/3
Bloomington (**)	12.98INC	13.23	M	2.43 on 3/3
Shelbyville	10.67	12.61	-1.94	2.21 on 3/3
Indianapolis Eagle Creek	12.09	11.68	+0.41	2.42 on 3/3

***Lafayette's** observed precipitation was incomplete 3/9, 3/25, 4/28, 4/30, and 5/19

****Bloomington's** observed precipitation was incomplete on 3/31

SPRING 2023 Total Precipitation (March-April-May) As Reported By Central Indiana CoCoRaHS Observers



For the period 700 AM EST 3/1/2023 -to- 700 AM EDT 6/1/2023. Data is unofficial.

Severe Weather

MARCH 2023's severe weather was infrequent yet deadly between scattered wind damage on the **3rd** and the region's greatest tornado outbreak in nearly a decade on the **31st**. The **3rd's** intense storm system brought both severe thunderstorms south of Bloomington (with numerous trees downed in Lawrence, Monroe, and Jackson Counties) and gradient winds that downed a combined nine trees and power lines in Knox County throughout the day. These non-thunderstorm winds also uprooted a tree that crashed into a car in Putnam County, killing two people inside and injuring two others.

March then ended like a ferocious lion on the **31st** when a strong and deepening storm system spawned 10 tornadoes across central Indiana in only an hour and twelve minutes. This nocturnal (evening) episode contained two sets of 5 tornadoes each – one set from a rotating supercell that sliced from Sullivan County to areas between Bloomington and Indianapolis – and, simultaneously, the other set from the curving portion of a severe squall line which extended from northeast of Crawfordsville to southern portions of Howard County. The southern set's tornadoes were more intense, with a long-track **EF3** that ended in Sullivan County, another **EF3** that hit Owen and Monroe Counties, an **EF2** in Morgan County, and an **EF0** and yet another **EF3** in Johnson County. The Sullivan County **EF3** tracked a total of 41 miles from its origin in Jasper County, IL; and once in Indiana, debarked trees and destroyed homes, including well-constructed buildings on the south side of the city of Sullivan. The Owen-Monroe County **EF3** touched down in McCormick's Creek State Park snapping trees, then caused major or complete damage of homes near the county line before tracking to northeast of Stinesville. The Morgan County **EF2** tracked nearly 9 miles just to the south and east of Martinsville damaging the roofs of several buildings and snapping trees. The Johnson County **EF0** tracked about 2 miles south of Bargersville, partially removing barn roofs and downing power lines. The Johnson County **EF3** tracked 3.5 miles through Whiteland, inflicting mainly EF1/EF2-intensity damage - causing major damage to residential homes; before intensifying towards the end of its track - completely destroying a long segment of a warehouse just west of I-65. The maximum estimated wind speed in the **three EF3** tornadoes was: Sullivan Co., **155 mph**; Owen-Monroe Co., **150 mph**; and Johnson Co., **140 mph**. The maximum width of these three tornadoes was 660, 400 and 316 yards, respectively.

The northern/squall line set of five tornadoes were less intense, with actually only two longer track non-EF0s: both the first, a 10.6-mile-long **EF2** that impacted mainly rural areas of Montgomery-Boone-Clinton Counties ... and the last, a 6.4-mile long **EF1** that did mainly tree, barn and home damage over southeastern Howard County, which injured one person, including roof and tree damage in a larger neighborhood southeast of Greentown. The three middle northern tornadoes were all shorter-track **EF0s**: a Montgomery-Boone County circulation that damaged a barn and trees, next a Howard County tornado south of Russiaville that did minor home damage and downed pine trees, and then another Howard County twister between Russiaville and Indian Heights which did minor home damage.

The Sullivan Co. **EF3** caused 3 fatalities and at least one injury, the Owen Co. **EF3** caused 2 fatalities and 2 injuries, and the Howard Co. **EF1** injured 1. These were the first tornado

MARCH 2023 SEVERE WEATHER (Con't...)

fatalities in Indiana since the Henryville and Holton tornadoes on 3/2/2012, and the first tornado fatalities in central Indiana since 6/3/2008. This was also the first time central Indiana saw an **EF3+** since the 8/24/2016 Kokomo EF3, and the first time the region experienced three **EF3s** in one day since five occurred on both 11/22/**1992** and 6/2/1990. Looking at March only, this was the first **multi-EF3+** episode since the 3/10/**1986** outbreak, and the **only March day** with more than two EF3+ on record (since 1950). Over a dozen more tornadoes across northern Indiana brought the state's total to 23 for this episode, which did also continue into very early on the 1st. Over 100 tornadoes occurred across the Mississippi Valley, Mid-South and Midwest.

Not to be outdone, non-tornadic severe weather also accompanied the **31st**'s events. Intense straight line winds were found adjacent to and north of the southern-counties' tornadoes, under the parent supercell's main downdraft: observed gusts of **75 mph** and **83 mph** spanned the width of Owen County; southwest of Martinsville in Morgan County, winds downed numerous large trees, snapped power poles, and produced considerable home damage; a **68 mph** gust was then recorded at the Shelbyville Airport; before, in Morristown (Shelby Co.), winds downed a gas station's overhanging roof; before the cell finally collapsed over the region's east-central zones, downing a small tree at the Lewisville COOP site (Henry Co.). Meanwhile the squall line's straight line gusts caused damage across several counties to the north: multiple power lines were downed over southwestern Fountain County; a **59 mph** gust was observed at the Crawfordsville Airport; a barn was blown apart west of Thorntown (Boone Co.); several barns/outbuildings saw major damage along the Clinton-Howard County line; and lastly, in between the two Howard Co. **EF0s**, gusts estimated to near **75 mph** damaged trees and ripped off a large barn's roof. Additional severe reports included measured severe winds along the west side of the Indianapolis Metro (see Miscellaneous section above) and estimated **65 mph** winds downing numerous power poles and lines across Madison County. Hail with these two storms was generally sub-severe, although isolated quarter-sized (1.00") hail was reported in Warren, far-northern Tippecanoe, and Montgomery Counties.

For further data pertaining to March 2023's severe storm systems, check out these links:

<https://www.weather.gov/ind/march32023stronglow>

<https://www.weather.gov/ind/march312023severe>

APRIL 2023's below normal precipitation trend was extended to the month's severe weather, with only two episodes – gradient winds on the 1st that brought isolated severe gusts to mainly central counties, and then a more organized episode of combined gradient and thunderstorm winds from dawn to noon on the 5th. The 1st's gusts, courtesy of the departing system that brought the **March 31st tornado outbreak**, were led by a **63 mph** observation at Indianapolis Int'l Airport and a **61 mph** report in Putnam County, while **58 mph** gusts occurred at both New Palestine (Hancock Co.) and Muncie.

The morning of the 5th found a nocturnal storm complex decaying while crossing the region, with first, early morning severe gradient winds on the leading edge of light rain, from Vigo

County to western and northern portions of the Indianapolis Metro ... secondly, damaging thunderstorm winds within the complex from Gosport (Owen Co.) into Marion County ... and finally additional cells that developed along and ahead of a late morning squall line, with damaging winds from Montgomery County into north-central zones. Gradient wind damage was focused between Bainbridge (Putnam Co.) and Danville (Hendricks Co.), northwestern Marion County including a **69 mph** gust at Eagle Creek Airpark, and from Avon to Brownsburg (both in Hendricks Co.) to Clermont (Marion Co.). The most notable thunderstorm damage reports ranged from several large trees and power lines downed in Owen County, to two tractor-trailers blown over on Interstate 65 between Lebanon and Whitestown, while Indianapolis Int'l recorded a gust to **62 mph**. A brief, weak **EF0 tornado** crossed US Route 136 just east of New Ross (Montgomery Co.), causing generally minor damage to several structures, and blowing roofing material as far as 500 yards. For further data pertaining to the 5th's severe weather, check out [April 5, 2023 Severe Storms](#).

MAY 2023 followed April's below normal trends in both precipitation and severe weather, with yet again only two episodes – large hail focused over northwestern counties on the overnight of the 6th, and a lone **EFU tornado** on the 8th. The 6th's nocturnal thunderstorms were devoid of damaging winds yet brought late evening to early morning hail, reported as large as **2.50"** and **3.00"** in Warren and Fountain Counties, respectively, before **1.25"** hail near Darlington (Montgomery Co.) was followed by several **1.00"** reports across Boone County. A rotating supercell thunderstorm on the 8th spawned a weak landspout **tornado** west of Flora (Carroll Co.), which was rated an EFU as it caused no damage, despite passing near a barn and through power lines.

For further data pertaining to these episodes, check out [May 6-7, 2023 Severe Hail](#) and [May 8, 2023 Tornado](#).

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

Miscellaneous Weather

MARCH 2023 was yet another blustery month across central Indiana. Windy conditions occurred on the **3rd**, **17th**, **25th**, and **31st**. On the **3rd**, most 1st-order sites recorded peak gusts around 50 mph, including 52 mph at Muncie and 50 mph at Lafayette, while Indianapolis reported 46 mph. On the **17th**, gusts of 40+ mph were common, with Indianapolis' 48 mph the highest mark. The **25th**'s peak gusts ranged from 44 mph at both Lafayette and Bloomington to 53 mph at Muncie, while Indianapolis reached 52 mph. Severe straight line gusts accompanied the **31st**'s tornado outbreak (see severe section above) with Indianapolis, Muncie and Shelbyville each recording **67 mph**, while Eagle Creek Airpark hit **59 mph** and Bloomington peaked at **58 mph**, while sub-severe, yet strong gusts occurred at Indianapolis and Terre Haute, 51 and 53 mph, respectively. The remainder of the month was breezy, with most sites gusting to 30+ mph on also the **4th**, **6th-7th**, **9th-10th**, **13th**, **16th**, **18th**, **20th-23rd**, and **29th**. Muncie and Indianapolis again had the greatest frequency of 30+ mph gusts at 18 days, with Eagle Creek Airpark right behind at 17 days. The only days with all 1st-order sites' peak gusts under 25 mph were the **2nd**, **5th**, and **15th**; while all 1st-order sites gusted to at least 17 mph on all 31 days.

Fog was quite common, with frequency ranging from 15 days at Shelbyville to 19 days at both Lafayette and Eagle Creek Airpark, with Indianapolis, Bloomington and Muncie observing fog on 16 days. All airports reported fog on the **3rd-5th**, **10th**, **12th**, **17th**, **22nd-25th**, **27th**, and **31st**; while fog occurred at most sites on the **9th**, **13th**, **16th**, and **18th**. Dense fog was uncommon, occurring at Muncie on the **5th**, **25th**, and **31st**; Lafayette on the **5th** and **11th**; and one day each at Bloomington, Terre Haute and Eagle Creek Airpark.

Thunder was confined to widespread events on both the **23rd** and **31st**, as well as all central/southern sites on both the **3rd** and early on the **24th**. Monthly totals were 2 days at Lafayette and Muncie, and 4 days elsewhere.

Relative humidity (RH) and dewpoint extremes across the 1st-order sites included occasional drier days through the early and especially mid-month, before brief moderately-high humidity occurred on both the **23rd** and **31st**. RH values dropped as low as 24% at Bloomington on both the **1st** and **8th**, with most 1st-order sites' RH also falling below 30% on the **8th**. The **15th** was March's driest day with Marion County sites recording a 20% minimum RH, while Bloomington and Shelbyville followed suit with 22% and 24%, respectively. Two more dry days occurred on the **20th** and **21st**, with the **21st**'s minimum readings leading the way: 21% at Muncie, and 22% at Bloomington, Shelbyville and Eagle Creek Airpark; Indianapolis' daily minimum RH was 23% both days. Moist southerly to south-southwesterly winds boosted dewpoints above 60F during the late morning on the **23rd** at central and southern sites, with 60F+ marks lasting south of the I-70 corridor through late day – Terre Haute and Bloomington recorded the highest values at 65F and 64F, respectively; Indianapolis' recorded a 63F dewpoint. Higher humidity then accompanied the **31st**'s evening severe event with 60F+ dewpoints again reaching all central and southern 1st-order sites briefly in the late evening – with Terre Haute hitting 63F while other locations peaked at 61F.

The 3rd's potent low pressure center that deepened while tracking from the mouth of the Ohio River into southern Indiana, brought very low barometric pressure to the region, with lowest values reported around 400 pm EST. At 1st-order airports, Shelbyville had both the greatest 3-hour pressure tendency (-12.7 mb early in the afternoon) and 1-hour pressure tendency (-6.5 mb); while 5-minute pressure tendencies were as great as -4.1 mb at Muncie (235-240 pm), with Indianapolis recording -2.0 (1245-1250 pm). Terre Haute measured a sea level pressure of 979.5 mb, which broke the city's all-time (since 1912) low record of 981.7 from 3/11/1923; meanwhile Indianapolis' minimum reading of 979.0 broke the previous March record low (981.0).

APRIL 2023's stronger peak wind gusts were not as persistent across central Indiana as in previous months. Windy conditions occurred on the 1st, 5th, 16th, 17th, 20th and 30th. On the 1st, most 1st-order sites gusted to 53 or 56 mph, while severe intensity was recorded with Indianapolis' gust to **63 mph**. Three of the seven sites passed the severe threshold on the 5th: **70 mph** at Eagle Creek Airpark, **61 mph** at Terre Haute, and **60 mph** at Indianapolis. Terre Haute lead the pack on the 16th, 17th, and 20th, reporting a peak gust of 46 mph each day; Indianapolis' 46 mph gust on the 30th was the strongest of 1st-order sites. Less-intense, yet noteworthy winds brought 30-39 mph peak gusts to a majority of sites on the 21st, 22nd, and 30th. Days with peak gusts over 30 mph ranged from 8 at Muncie to 14 at both Lafayette and Terre Haute, while Indianapolis peaked at 30+ mph on 12 days. All 1st-order sites' gusts peaked under 25 mph on the 10th, 13th, 14th, 26th, and 27th; with mainly lighter breezes also occurring on the 6th and 18th.

Fog was noticeably less common than in March 2023, with frequency ranging from 8 days at Bloomington and Lafayette to 10 days at Indianapolis and Shelbyville. All airports reported fog on the 4th-5th, 28th, and 30th; while fog occurred at most sites on the 16th-17th, 21st, 26th-27th, and 29th. Dense fog was once again uncommon, occurring at Bloomington and Shelbyville on the 29th, and again at Shelbyville on the 30th.

Thunder was infrequent, yet did occur at all 1st-order sites on the 5th, and most of these sites on the 29th and 30th, while confined to only along the Wabash Valley on the 20th. Monthly totals ranged from 2 days at Muncie and Eagle Creek Airpark to 4 days at Bloomington, Shelbyville and Terre Haute.

Relative humidity (RH) and dewpoint extremes across the 1st-order sites included rather brief moderately-high humidity on the 4th-5th, before several drier days through the second and third weeks of the month. Dewpoints rose to the mid-60s through the 4th-5th, with highest readings of 66F at Terre Haute through the early afternoon on the 4th, and 65F at Indianapolis briefly after noon on the 5th. The drier pattern took over soon after, with minimum relative humidity values dropping to 24-25% on the 7th at Bloomington and Marion County airports, before Bloomington, Terre Haute and Shelbyville all observed minimum RHs of 22-24% on both the 8th and 9th. All 1st-order sites reported RHs under 25% on the 10th, 13th, and 20th; with Bloomington leading the pack on each day with 17%, 17%, and 20%, respectively, while Indianapolis followed with 20%, 22%, and 23%, respectively. Additionally, Shelbyville dropped

to 24-25% on the **11th**, **12th**, and **26th**; while other marginally-dry values were recorded at Lafayette and Muncie on the **12th** and Bloomington on the **18th**.

MAY 2023's stronger peak wind gusts were even less frequent across central Indiana than in April 2023. Windy conditions were only widespread on the **1st** when Terre Haute observed 50 mph, and most 1st-order airports gusted to 42 mph or greater; then only isolated strong gusts were reported on the **7th** (Terre Haute's 43 mph) and the **13th** (Indianapolis' **56 mph**). Less-intense, yet noteworthy winds brought 30-39 mph peak gusts to all sites on the **2nd** and most locations on the **19th**; Indianapolis led the pack with peak gusts at or over 30 mph on 7 days, while nearly all other 1st-order sites peaked at 30+ on only 4 or 5 days. All 1st-order sites' gusts peaked under 25 mph on the **4th**, **10th**, **11th**, **13th**, **15th**, **17th**, **18th**, **21st**, **22nd**, and **30th**; with mainly lighter breezes also occurring on the **16th**, **23rd**, **27th**, and **28th**.

Fog frequency followed the rather low pattern established in April, ranging from 6 days at Muncie to 10 days at Shelbyville. All airports reported fog on the **7th**, and **19th**; while fog occurred at most sites on the **1st**, **4th**, **13th** and **20th**. Dense fog at 1st-order airports was limited to only Terre Haute and Shelbyville on the **17th**.

Thunder was quite low for May, yet did occur at all 1st-order sites on the **7th**, and most of these sites on the **6th** and **19th**, with Indianapolis one of three sites that reported thunder on the **8th** and the **13th**. Monthly totals ranged from 2 days at Muncie to 5 days at Indianapolis.

Amid the rather quiet and dry month, several strong swings in humidity were present, including higher dewpoints into at least the mid-60s on the **7th-8th**, **12th-14th**, and (at central/southern sites) on the **31st**, and dry conditions on the **9th-11th**, **16th-18th**, **24th-29th**. Highest dewpoints at 1st-order sites were observed on the **13th** when Terre Haute reached 70F for a couple hours in the evening, with 69F at both Lafayette and Bloomington during the day. Low relative humid (RH) values were more prevalent, especially through the month's fourth week: Shelbyville's daily minimum RH values were 22-23% on the **9th-10th**, with the **10th** also bringing 20-25% values to Indianapolis, Lafayette and Bloomington, while Muncie dropped to 21% on the **11th**; Muncie was the lone drier spot on the **16th-18th** with 22-24% each day, except for the **18th** when Lafayette's minimum was 20%; nearly all 1st-order sites recorded RH values of 25% or less on the **24th** and **26th**, including 14% at Eagle Creek Airpark on the **24th** and 18% at Lafayette on the **26th**, most sites also saw 21-24% on the **25th**; for the **27th-29th** Lafayette, Muncie and Shelbyville all recorded 20-25% each day, while Marion County sites both dropped to a 24% RH on the **28th**.

The fourth week's corresponding very low dewpoints were led by 20F at Muncie as the **24th** ended, 23F at Eagle Creek Airpark as the **25th** began, and even 26F as far southeast as Shelbyville on the **26th**; Indianapolis' readings followed closely with dewpoints as low as 24F, 31F and 31F on the **25th**, **26th**, and **27th**, respectively. Anomalously low humidity was not present at only the surface, as the **21st**'s morning weather balloon that was released from the NWS Wilmington, OH office measured a record low precipitable water content through the vertical column.

Indianapolis Spring 2023 Monthly Data

INDIANAPOLIS MARCH 2023 SUMMARY

	Average Temp	Precipitation	Snowfall	Highs $\geq 70^{\circ}/80^{\circ}$
March 2023	42.2	6.03	1.5	2/0
Normal March	42.4	3.69	3.2	3/0
Diff from Normal	-0.2	+2.34	-1.7	-1/0

March 2023 All-Time Ranks...

Precipitation: **21st Wettest**

Temperature: **64th Mildest**

Snowfall: **60th Least Snowiest** (Tied)

INDIANAPOLIS APRIL 2023 SUMMARY

	Average Temp	Precipitation	Snowfall	Highs $\geq 70^{\circ}/80^{\circ}$
April 2023	54.2	2.29	T	12/5
Normal April	53.6	4.34	0.2	10/2
Diff from Normal	+0.6	-2.05	-0.2	+2/+3

April 2023 All-Time Ranks...

Precipitation: **35th Driest**

Temperature: **41st Mildest** (Tied)

Snowfall: **25th Least Snowiest** (Tied)

INDIANAPOLIS MAY 2023 SUMMARY

	Average Temp	Precipitation	Snowfall	Highs $\geq 70^{\circ}/80^{\circ}$
May 2023	64.5	2.84	0.0	25/10
Normal May	63.6	4.75	0.0	21/10
Diff from Normal	+0.9	-1.91	0	+4/0

May 2023 All-Time Ranks...

Temperature: **48th Warmest**

Precipitation: **50th Driest**

INDIANAPOLIS SPRING 2023 SUMMARY

	Average Temp	Precipitation	Snowfall	Highs $\geq 70^{\circ}/80^{\circ}$
Spring 2023	53.6	11.16	1.5	39/15
Normal Spring	53.2	12.78	3.4	33/12
Diff from Normal	+0.4	-1.16	-1.9	+6/+3

Spring 2023 All-Time Ranks...

Precipitation: **75th Driest** / 78th Wettest (Tied)

Temperature: **37th Warmest** (Tied)

Snowfall: **50th Least Snowiest** (Tied)

Summer 2023 Outlook for Central Indiana

The official outlook for the 2023 summer season (June-August) from the Climate Prediction Center, indicates equal chances of above normal, below normal, or near normal temperatures. The outlook also indicates slightly greater chances of above normal summer precipitation for central Indiana.

At Indianapolis, the normal summer temperature is **74.3** degrees and the normal summer precipitation is **12.57"**.

*Data prepared by the NWS Indianapolis Weather Forecast Office's Indiana State Climate Team
Questions should be referred to w-ind.webmaster@noaa.gov*