Summer 2022 Review

of Weather Conditions Experienced In Central Indiana

27th Warmest on record at Indianapolis (Tied)
39th Driest on record at Indianapolis

Temperatures

JUNE 2022

June 2022 was overall rather warm, with most locations averaging 1.0 to 2.0 degrees above normal across central Indiana.

Record heat/humidity during the **13th-16th** marked the core of a week-long anomalously hot period (see below table). Indianapolis set three new record high minimum temperatures on the **14th**, **15th**, and **16th**. This was the first three-consecutive day period of any record warmth since upper 70s graced the city in early November 2020, and the first three-peat of record heat in June since hot overnights in mid-June of 1981. Unseasonable heat returned to the region briefly during the **21st-22nd**, when more reasonable humidity levels promoted temperatures equaling mid-month maximums at four of the seven 1st-order sites. Despite these ~10 hot to very hot days, the month was only the warmest since 2018 at Indianapolis given seasonable to rather cool conditions through the rest of the month. Lowest temperatures were reported during the **3rd-4th**, **9th-10th**, and **28th-29th**. Lafayette recorded the coldest morning during the first week, dropping to **47F** on the **4th**. Several days later Farmland 5 NNW (Randolph Co.) and Kokomo 3 WSW (Howard Co.) both followed suit with their own **47F** observations early on the **9th**, although points south were milder with a low of 56F at Indianapolis. Cool mornings occurred again towards the month's end, and with some of the lowest readings in unexpected locations. The morning of the **29th** found **44F** at New Castle 3 SW (Henry Co.), while stations across the region's far south observed 48F – at Shoals 8 S (Martin Co.) and North Vernon 2 ESE (Jennings Co.). Not to be outdone, Indianapolis dropped to a rather cool 56F on the **28th**.

June 2022's above normal temperatures continued the rather warm trends from both June 2021 and May 2022. At Indianapolis, June 2022's daily average temperatures were above normal on 19 days and below normal on 10 days. It was the (tied) 30th warmest June for the Indianapolis Area since weather records began in 1871, placing it in the 80th percentile of all recorded Junes.

JUNE 2022 HEAT WAVE – 6/13 TO 6/17																				
1st-Order SITES	NORMAL	MON, 6/13			TUE, 6/14			WED, 6/15			THU, 6/16			FRI, 6/17					
INDIANAPOLIS	82	91	+9	78	93	+14	76	92	+11	73	93	+13	74	88	+7	73			
IND	63	71			78 RER			75 RER			79 RER			71		48			
LAFAYETTE	81	91	+9	81	95	+13	79	93	+13	74	96	+13	75	88	+7	70			
LAF	60	67			72			75			72			68		51			
MUNCIE	83	91	+8	77	**97**	+14	76	95	+13	73	94	+13	74	89	+4	70			
MIE	64	70			76			79			**80**			67		46			
INDY-EAGLE CRK	82	92	+9	79	96	+15	77	94	+12	73	94	+14	75	89	+7				
EYE	63	70			77			75			**80**			70					
TERRE HAUTE	84	95	+12	80	**97**	+16	77	96	+13	74	**97**	+15	76	93	+9	76			
HUF	62	73			**81**			76			78			70		54			
BLOOMINGTON	83	93	+11	81	93	+15	77	93	+13	73	93	+14	77	88	+7	75			
BMG	62	72			**80**			76			78			71		54			
SHELBYVILLE	84	93	+9	80	**98**	+15	79	96	+14	76	94	+11	75	92	+9	75			
GEZ	63	71			77			77			76			73		50			
Selected COOP SITES		MON, 6/13			TUE, 6/14			WED, 6/15			THU, 6/16			FRI, 6/17					
CRAWFORDSVILLE 6 SE		88			92			90			93			87					
TIPTON 5 SW		91			**97**			96			94			94					
NEW CASTLE 3 SW		88			94			92			90			86					
FARMERSBURG TV-2		96			**98**			**97**			95			90					
SHOALS 8 S		**97**			**97**			96			**97**			88					
NORTH VERNON 2 ESE		91			93			93			91			85					

Tabular summary of June **13th-17th's** hot and very humid conditions. Observed maximum and minimum temperatures are shown for the seven 1st-order/ASOS sites (top), while daily highs are also included for the six selected COOP sites (lower). Highest max/min temps for each group are indicated by shaded background, with Indianapolis record highs denoted by "RER". "+9", etc. indicates each day's overall departure (°F) from the site's normal temperature. Daily dewpoint maximums are shown for ASOS sites by values in green, as well as minimum dewpoints in brown on 6/17 following the arrival of Canadian high pressure as the sultry workweek came to an end.

JULY 2022 TEMPERATURES

July 2022 was very warm across central Indiana, with most of the region averaging 2.0 to 3.0 degrees above normal. While no records were tied nor set at Indianapolis, the month's first week brought the highest temperatures in a decade to most locations, with four 1st-order airports and three COOP stations reaching **100-102F**. The remainder of the month was non-anomalous, with 20 of the remaining 24 days within 5 degrees of normal at Indianapolis, as an often humid pattern kept diurnal ranges well regulated. High temperatures from the **8th** onward were mainly in the mid-80s to low 90s while low temperatures were generally in the mid-60s to around 70F. A better mark of comfort were dewpoints (see details in miscellaneous section below), as several of the more pleasant days often climbed to above normal afternoon maximums under ample sun. Synoptically, the north-south gradient along the northern expanse of the summer's upper-level, subtropical ridge was more prevalent than normal over northern portions of the region: the greatest deviations from normal were across southern counties (Bloomington and Shelbyville's departures were both +3.0 degrees), and were much greater than far northern zones (Muncie's departure was only +0.4 degrees).

July started on a hot note when moderate humidity promoted widespread low to mid-90s on the **1st**, with Muncie, Shelbyville and Terre Haute all hitting **96F**, while 95F was reached at both Indianapolis and the Southwest Purdue AG Center at Vincennes 5 NE (Knox Co.); this was the first time Indianapolis recorded two 95F+ days in a single year since 2013. The **4th** brought an afternoon high of 92F at all 1st-order airports, except for Terre Haute which peaked at **93F**; this was the year's tenth 90F+ day at Indianapolis; meanwhile Vincennes 5 NE reached **95F** again. The hottest day in nearly a decade then followed on the **5th** when generally west-southwesterly, and at times robust winds allowed drier air aloft to reach the surface, enhancing heating across central Indiana. Highs common in the upper 90s brought the hottest day since 7/25/2012 to most places, with 100F observations at Lafayette, Shelbyville, Eagle Creek Airpark, and the Columbus (Bartholomew Co.) and Shoals 8 S (Martin Co.) COOP stations, and the highest readings of 101F at Terre Haute and **102F** at the Farmersburg TV-2 COOP station (Sullivan Co.). Officially, Indianapolis hit 99F, which was the year's third 95F+ day – the most since 2013; meanwhile typically cooler locations also had hot days, with 92F recorded at both the New Castle 3 SW (Henry Co.) and Whitestown (Boone Co.) COOP stations. After most 1st-order airports finished the **5th** 12 to 14 degrees above normal, the **6th** had the highest minimum temperatures for many sites, including **80F** at Farmersburg TV-2, 79F at Eagle Creek Airpark, and 78F at Indianapolis, Bloomington and Terre Haute. Highs in the low to mid 90s continued for many sites on the **6th**, as both Indianapolis 1st-order airports hit 94F, and several of the typically warmer COOP sites climbed into the mid-90s, including **96F** at the Franklin WWTP (Johnson Co.); most 1st-order airports finished 9 to 11 degrees above normal for their overall 2nd-hottest day of the month.

The **8th**-**14th** was generally near normal, including a mixture of lower-humidity days with a greater diurnal temperature range and cloudier or more-humid days with smaller daily spreads. A much-needed Canadian blast flowed into the Midwest late on the **9th**, bringing morning lows on the **10th** in the mid-50s to around 60F, with **52F** at the Young America (Howard Co.) COOP site and 53F at Crawfordsville 6 SE (Montgomery Co.); meanwhile Muncie dropped to 55F, with 61F at Indianapolis. The **11th** saw a very warm afternoon with Indianapolis and most other 1st-

JULY 2022 TEMPERATURES (con't)

order sites peaking at 89F, while the Tipton 5 SW (Tipton Co.) COOP station hit **92F**, while the Davis Purdue AG Center at Farmland 5 NNW (Randolph Co.) only reached 82F. The **12th** had a warm morning in some locations, with Indianapolis and most 1st-order airports only falling to the low 70s. Another very warm PM occurred on the **13th** with 89F again the maximum at Indianapolis and most 1st-order sites.

The third and fourth weeks of July were often near normal mid-summer warmth and humidity, with several noticeably warmer/hotter days on the **19th**-**24th**. Temperatures on the **19th** reached **91F** at Eagle Creek Airpark, Shoals 8 S and Tipton 5 SW. The **20th** then brought widespread low to mid-90s, led by **96F** at Shoals 8S, and 95F at Lafayette and Vincennes 5 NE. More moderated heat was on tap for the **21st**, although increasing dry conditions across northern counties promoted **92F** at both Lafayette and Tipton 5 SW. Heat surged again on the **22nd**, with **95F** observed at both Shoals 8 S and Vincennes 5 NE, while Marion County airports led 1st-order sites' readings with highs of 93F. The weekend of the **23rd** and **24th** found heat focused across southern counties as various daytime clouds/showers prevailed for points north. Southwesterly flow boosted Vincennes 5 NE to **95F** and **94F**, respectively, while maximums at Shoals 8 S were 1 degree lower on both days; meanwhile Washington 1 W (Daviess Co.) hit **95F** and 93F, and Bloomington (which had actually only risen above 93F once in July) was the hottest of all 1st-order airports across both days, peaking at 91F and 93F. Not to be outdone, on the **20th**-**22nd** Indianapolis peaked at 94F, 90F, and 93F, respectively, while topping out in the upper 80s on the other three days within this warmer 6-day period.

As July's end approached, Canadian air plunged into the central Plains before sliding over the Midwest, bringing a pleasant cool blast that moderated readings on the **29th**-**30th**. Most 1st-order airports recorded the lowest temperatures of the month, from **55F** at Muncie to 60F at Indianapolis. Most other locations saw a comparable cool down to that of the **10th**, with many COOP stations actually reporting the same, lowest reading that they had on the **10th**. On the **30th**, Crawfordsville 6 SE led the colder sites with **54F**, while 55F was observed at New Castle 3 SW and West Lafayette 6 NW. The **29th** had also had a chillier morning for northern sites as the air mass arrived, as Farmland 5 NNW dropped to **55F**.

July 2022 was certainly a very warm summer month across central Indiana, and the hottest month for the Indianapolis Area since July 2020 (78.4°F), as well as the third hottest month since the anomalous August 2016 (78.2°F). Indianapolis hit 90F or above on 9 days, while morning lows were held to 70F or higher on 14 days – both values were above normal. As for year-to-date tallies, Indianapolis now has 16 90F+ maximums (the most through July since 2018) and 21 70F+ minimums (the third-most through July since 2012). July at Indianapolis normally has 3 mornings drop into the 50s, although July 2022 did not fall below 60F which only occurs in 13% of Julys. July 2022's above normal temperatures continued June 2022's trend, while in contrast to the near to slightly below normal readings in July 2021. At Indianapolis, July 2022's daily average temperatures were above normal on 20 days and below normal on 9 days. It was the 32nd warmest July for the Indianapolis Area since weather records began in 1871, placing it in the 83rd percentile of all recorded Julys.

AUGUST 2022 TEMPERATURES

August 2022's warmth was overall slightly above normal. The prevailing synoptic pattern through the month found the summer's hot subtropical ridge staying mainly west of Indiana, while moderating upper troughs were generally east or northeast of the region, with their associated areas of cooler surface high pressure often crossing the Great Lakes or setting up near the central Appalachians. Situated between these features, central Indiana's resulting temperatures were often near normal, although the month's warm trend was set by several hot days during the **3rd-8th**; robust southwesterly flow courtesy of cyclones crossing the central/ northern Plains brought the western ridge's warmth into the Midwest. Through August, greater departures above normal were observed across southern counties that only caught the periphery of cooler high pressure, as well as the upper Wabash Valley whose antecedently dry soils promoted hotter daytimes. For the second consecutive month, Muncie was the relative cool spot, where 11 mornings in the 50s led near-normal readings.

August started on a hot note. Essentially all sites reported above normal temperatures through the **1st-8th**, although only noticeably so on the **3rd**, **6th**, **7th**, and **8th**. Persistent drought over the Upper Wabash Valley promoted temperatures farther above normal at Lafayette. Very warm levels were recorded on the month's first two days, with mid to upper 80s common on the **1st**, and **90F** reached at both Lafayette and Rockville (Parke Co.); and a warm morning on the **2nd** led by 72F at Shoals 8 S and 70F at Eagle Creek Airpark. On the **3rd**, all 1st-order airports reached at least 92F, with **95F** at Lafayette and 93F at Indianapolis; Farmersburg TV-2 (Sullivan Co.) saw the muggiest morning with a low of 71F . High humidity then continued to promote warm overnights, with the highest observations being 74F at Muncie on the **4th** and 73F at Terre Haute on the **5th**. The strongest push of daytime heat then followed: upper 80s to low 90s, along with lows in the low to mid 70s were common during the **6th-8th**. On the **6th**, Shoals 8 S hit **94F** again while Bloomington topped out at 92F, and Shelbyville only dropped to 75F. The **7th** brought **93F** at Shoals 8 S, while 92F was common across 1st-order airports and several COOP sites, including Perrysville 4 WNW (Vermillion Co.); Lafayette had the highest low at 74F. The **8th** had the overall warmest morning, with 75F recorded at most 1st-order sites, including Indianapolis, while Rockville only dropped to a sultry **78F**; highest afternoon maximums included yet another **94F** at Shoals 8 S, and several 93F marks south of I-74, including the Southwest Purdue Ag Center's Vincennes 5 NE COOP station (Knox Co.). Indianapolis observed five consecutive mornings of 70F+ over the **4th-8th**, and low 90s through the **6th-8th**.

Relief came amid near normal temperatures on the **10th-11th**. Central Indiana then caught the southern side of a cooler bubble of Canadian high pressure crossing the Great Lakes on the **12th-13th**. Afternoon highs in the upper 70s to around 80F were common both days, with the **12th** only reaching 77F at Muncie as well as the NWS Indianapolis office, and even points as far south as North Vernon 2 ESE (Jennings Co.); the **13th**'s lowest maximum was 74F at the New Castle 3 SW (Henry Co.), Carmel 3 E (Hamilton Co.), and West Lafayette 6 NW (Tippecanoe Co.) COOP stations. Overnight temperatures dropped into the 50s at essentially all sites both days, with the **12th** finding 54F at Muncie and **51F** at Farmland 5 NNW (Randolph Co.), and the **13th** bringing 51F to New Castle 3 SW and an autumnal **49F** at the Tipton 5 SW (Tipton Co.) COOP station. More summer-like air returned to Indiana on the **14th**, although clouds kept high temperatures in the 70s at most locations, and as low as 72F at the Jamestown 2 E (Boone Co.)

AUGUST 2022 TEMPERATURES (con't)

COOP station. Indianapolis' maximums through this cooler spell were 78F, 79F, and 75F, respectively.

The remainder of the month was overall seasonable, with Indiana often situated between the hot western ridge and deeper troughs to the northeast; several days of near to slightly below normal readings over the **15th-27th** were offset by two hot days on the **28th-29th**. Despite August's hot start, after the **9th** no 1st-order site reached 90F+ past the **28th-29th**, nor had a daily minimum held to 70F+ (excepting Bloomington and Shelbyville's lows in the low-70s on the **29th**). High temperatures on the **28th** reached the low 90s at most locations, with the highest readings of **95F** at Tipton 5 SW and 94F at Bloomington, Shoals 8 S, and Vincennes 5 NE. Heat continued for the **29th**, with many spots peaking near 90F, while Rockville reached **93F** both days. Indianapolis hit 92F and 90F, respectively. August returned to moderation for the month's end, with a cooler morning on the **31st**: mid to upper 50s were common, with 58F at Indianapolis, 54F at Lafayette and **51F** observed at Crawfordsville 6 SE.

Frequency of 90F+ maximums was 5-6 days across 1st-order stations, while frequency of 70F+ minimums was 5-7; both ranges were near normal. Indianapolis finished the month having totaled 22 90F-days for the year, which was slightly above normal (17) following notable hot periods during both mid June and early July. Indianapolis had also tallied 26 70F+ daily lows for the year, which is also slightly above normal (23) courtesy a consistently humid July. August's last three week's of high temperatures consistently in the 80s and low temperatures often near 60F led a more modest above-normal trend than the more distinctive warmth found during both July 2022 and August 2021.

Summer 2022 Temperature Data for Central Indiana Sites

Site	**Summer 2022 Av Temperature**	Summer Season Normal Temp	**Difference From Normal**
Indianapolis Int'l Airport	**75.8**	73.9	**+1.9**
Lafayette	**73.9**	72.2	**+1.7**
Bloomington	**75.6**	73.4	**+2.2**
Muncie	**74.8**	74.4	+0.4
Terre Haute	**75.5**	73.9	**+1.6**
Shelbyville	**76.4**	74.2	**+2.2**
Indianapolis Eagle Creek AP	**76.2**	74.3	**+1.9**

Summer 2022 Temperature Extremes Across Central Indiana

Site	Highest Temperature	Lowest Temperature
Indianapolis Int'l Airport	99 on 7/5	54 on 6/3
Lafayette	100 on 7/5	**47** on 6/4
Bloomington	97 on 7/5	51 on 6/28, 6/29
Muncie	97 on 7/5	50 on 6/28
Terre Haute	**101** on 7/5	51 on 6/4, 6/28
Shelbyville	100 on 7/5	52 on 6/28
Indianapolis Eagle Creek AP	100 on 7/5	54 on 6/28

Precipitation

JUNE 2022

Following the release of the new 30-year climatological normals (1991-2020), June is now normally the year's wettest month at six of central Indiana's seven 1st-order airports – all but Terre Haute. The past 30-year normals (1981-2010) placed June as normally 2nd wettest (behind May) at four of the seven airports, although at Indianapolis June had been the 3rd-wettest month of the year behind May and July. Upward trends from past to present 30-yr normals were greatest across the middle of the region, where normal June rainfall increased by +0.46" at Lafayette, +0.67" at Eagle Creek Airpark, +0.70" at Indianapolis, and +0.76" at Shelbyville. The three other airports saw modest upward trends of +0.20" or less. Terre Haute's normal June rainfall maintained it's 3rd-wettest month rank behind April and May; while an outlier from the other airports, this is actually a reflection of typical precipitation trends over far southern and far southwestern central Indiana. June also ranks as only the 3rd-wettest month for six COOP sites along the US-50 corridor between Knox and Jackson Counties, while June is the 2nd wettest month amid a narrow transition zone that passes over Elliston (Greene Co.). This north-south difference in seasonal timing of peak rainfall follows the Mid-West's typical wetter-to-drier change from spring to late summer, which occurs earlier in the year for points towards the Ohio River. Normal June precipitation values range from 4.56" in Lafayette to 5.16" at Shelbyville, with most sites within 4.80-5.10". June 2022, however, negated the new normals' upward trend, as modest totals through June **15th** were followed by abnormally dry conditions.

JUNE 2022 PRECIPITATION (con't)

June began with afternoon to early evening thunderstorms on the **1st**, across the southeastern half of central Indiana, which were followed by occasional light to moderate late night rain; while most of the region saw less than 0.10", storm totals were greatest along a line from **1.67"** north of Oolitic (Lawrence Co.), through **1.70"** near Flat Rock (Bartholomew Co.), to **1.83"** in Rushville (Rush Co.). Dry conditions prevailed during the **3rd**-**5th**, before an active second week.

On the **6th**, a few morning showers led to numerous afternoon thunderstorms and then a lighter widespread evening rain; 0.10-0.80" was common, with several small patches of **1.00**-**1.70"**, with **2.47"** near Winchester (Randolph Co.), **2.18"** in Westfield (Hamilton Co.), and **1.65"** near Stanford (Greene Co.). The **8th** brought scattered morning to midday, briefly heavy showers, that were soon followed by numerous t-storms through early evening; much of the region picked up 0.25-0.80", with 0.82" south of Ellettsville (Monroe Co.) and 0.80" in Rushville being the greatest observations. On the **10th**, periods of rain trended from generally southern counties during the daytime to more central/northern zones in the evening. After midnight a rather narrow band set-up along a Rockville to Seymour line; sites that received rain from all rounds reported the greatest totals – **1.02"** near Reelsville (Putnam Co.), 0.94" north of Spencer (Owen Co.) and 0.71" at Seymour 1 WSW. The **11th** found isolated afternoon showers precede widespread evening to overnight thunderstorms across mainly central/northern counties, with further scattered showers over southwestern zones towards dawn on the **12th**; totals were 0.50-1.30" for much of the region, with a few reports around **1.85"** from south of Anderson

(Hamilton Co.) to Modoc (Randolph Co.), and **1.73"** east of Martinsville (Morgan Co.). Rains continued on the **13th**, with locally potent thunderstorms forming in the morning along/near the I-74 corridor; Clayton (Hendricks Co.) measured **1.49"**, although amounts closer to 3.00" likely fell over rural portions of Parke and Putnam Counties. The fourth consecutive day of storms, the **13th**, welcomed the arriving heat wave, with brief heavy downpours during the afternoon along/north of I-74; the narrow axis of greatest reports extended from **1.31"** south of Pike (Boone Co.) to **2.22"** west of Wilkinson (Hancock Co.). 4-day rainfall totals (for the **10th**-**13th**) ranged from **1.00**-**2.40"** for most locations, and especially the northern half of the region, with **3.13"** west of Wilkinson, **2.54"** in Kilmore (Clinton Co.), and **2.01"** in Beanblossom (Brown Co.). 8-day totals (for the **6th**-**13th**) were mostly **1.50**-**2.80"**, while locally anomalous totals included **4.44"** near Winchester, **3.62"** in Wilkinson, **3.29"** in Clayton, and **3.15"** near Hayden (Jennings Co.); meanwhile most of the climatologically wetter Wabash Valley and the US-50 corridor for Bedford and west totaled mainly below 0.75".

A final episode of mid-month thunderstorms graced at least southwestern portions of the region from dawn to noon on the **17th**, with generally 0.25-0.90" falling southwest of Bloomington, with isolated heavier observations under the heaviest cells: **1.90"** at Elnora (Daviess Co.) and **1.06"** along the Wabash River near Graysville (Sullivan Co.). The month's remaining two weeks were abnormally dry as Gulf of Mexico moisture was continually suppressed by an upper-level ridge centered over the southern Plains, starving out better rainfall potential from the few northern-stream waves that approached Indiana. The **22nd** found afternoon storms develop over far southeastern counties just before advancing out of the area, with a small swath of sub-1.00" readings along the US-50 corridor from Lawrence

JUNE 2022 PRECIPITATION (con't)

County and east. On the **25th**, two rounds of approaching rain/storms collapsed while attempting to cross the region, yet rain was deposited onto the dry ground, both in the afternoon over mainly northwest counties and then over all but eastern zones later in the overnight; combined totals were generally meager with 0.10-0.50" common over the western half of the region, and only a narrow patch of 0.75-0.90" along the Wabash River from Fountain County down to Terre Haute proper.

Official "Abnormally Dry" (**D0**) and "**Moderate Drought**" (**D1**) conditions expanded eastward across the region following late June's overall lack of rainfall. The upper Wabash Valley continued to exhibit the driest conditions. What started as a relatively small area of **D0** over Warren County as of the June **7th** update, expanded slowly into northern Fountain County and southwestern Tippecanoe County as of the **14th**, before becoming **D1** as of the **21st**, with **D1** then expanding as of the **28th** to also include the entire upper Wabash Valley into far northern Vigo County. Meanwhile **D0** conditions had expanded as of the **21st** as far south and east as a Terre Haute-Lebanon-Alexandria line, before enveloping all of the region, excepting small portions of Henry, Rush and Randolph Counties as of the **28th**. No river or stream flooding was observed in June.

In summary, despite several opportunities for rain through much of the month's first half, June fell well short of the ~4.50-5.20" climatological normals. Percentage of normal values across 1st-order airports ranged from 20% at Eagle Creek Airpark to 44% at Lafayette. The convective

nature of rainfall events led to a highly-variable distribution of the limited rain, with several sites being outliers from the common 1.00-3.00" totals. Nearing normal values were several sites along far eastern counties, including **4.52"** near Hayden (Jennings Co.), as much as **4.41"** in the Rushville (Rush Co.) area, and **4.59"** near Winchester (Randolph Co.). More representative of the increasingly parched conditions were several sites that fell short of 1.00" across both far northern zones and to the south of Indianapolis, including **0.72"** at the Throckmorton-Purdue Agricultural Center at South Raub and **0.91"** west of Battle Ground (both in Tippecanoe Co.), and totals as low as **0.61"** in Kokomo (Howard Co.); as well as **0.87"** east of Paragon (Morgan Co.), **0.93"** in Franklin (Johnson Co.), and **0.62"** in New Palestine (Hancock Co.). Speaking historically, most notable were the **1.31"** at Pence 1 SW (Warren Co.), making it the driest June in the site's 31-year record, and Kokomo 3 WSW (Howard Co.)'s **1.01"**, which was the 4th driest since records began in 1902 (a 30-year return period). **1.18"** fell at Indianapolis International Airport, which was a mere 24% of normal. Three of the last six Junes at Indianapolis saw either anomalously high (2017, 2020) or unseasonably low (2018) rainfall, although 2022 continued the slightly below normal pattern from both June 2019 and June 2021. The year-to-date total at Indianapolis rose to **19.75"**, taking Indianapolis into a deficit for the first time this year – **3.53"** below normal. June 2022 was the **8th driest** in the Indianapolis Area since weather records began in 1871, placing it in the 95th percentile driest of all recorded Junes.

JULY 2022 PRECIPITATION

Following the release of the new 30-year climatological normals (1991-2020), July is now the third-wettest month (behind May and June) for four of central Indiana's seven 1st-order airports - those along the Interstate 69 corridor. At Shelbyville and Terre Haute, July fell from the year's 2nd wettest month to the 4th; while at Lafayette it rose from 3rd to 2nd wettest. June is now normally wetter than July at all 7 sites, with April and/or June being the months that trended from drier than to wetter than July from the previous (1981-2010) to new normals at four of the seven sites. Normal July precipitation values, from the old to new normals, had either a slight downward or essentially no trend at most sites, while greater downward trends occurred at Muncie (-0.30"), Terre Haute (-0.45"), and Shelbyville (-0.84"). Spatial distribution of July's new normal precipitation totals lacks the typical north-south gradient, with the contrast between Bloomington (4.89") and Shelbyville (3.87") being the most distinctive feature; elsewhere normal totals range from Lafayette (4.08") to Indianapolis (4.42").

On the **1st**, isolated afternoon thunderstorms across northern and far southern counties preceded evening storms along and just south of I-70, before further late evening-overnight rain fell on central and southern counties; 1-day precipitation grand totals were locally 0.50"+ south of I-70, including **1.18"** northwest of Franklin (Johnson Co.) and **1.84"** in Rushville (Rush Co.) where a downburst occurred. On the **4th**, generally very light rainfall fell across northern counties, although collapsing, southerly-moving, evening storms over the region's far northwestern zones dropped as much as **1.33"** at the Pence 1 SW (Warren Co.) COOP site and **1.53"** at the Perrysville 4 WNW COOP station (Vermillion Co.).

The July **5th** drought monitor update indicated a staunch expansion of "Abnormally Dry" (**D0**) or drier conditions across all of the region's counties; Moderate Drought (**D1**) encompassed nearly half of the region following an expansion from only the Upper Wabash Valley in late June, to all points north/west of a line from southern Vigo County, across Indianapolis, to western Delaware County; **D1** also crept into far southern Daviess and Martin Counties.

Four consecutive days (**6th**-**9th**) of showers and thunderstorms over at least some parts of the region helped to mitigate or even improve drought conditions. The **6th**'s several rounds of showers and thunderstorms were led by more intense early afternoon rainfall across the southeastern half of the region; greatest observations were from locations that were so-far least impacted by drought – **1.59"** in Harrisville (Randolph Co.) and **1.31"** in Millhousen (Decatur Co.). The **7th**'s slow-moving afternoon rain and storms brought a much needed widespread soaking to the region's southwestern quadrant where 0.50-**1.50"** was common, with **3.71"** at the Graysville 5 WNW (Sullivan Co.) COOP site, **2.87"** at Howesville (Clay Co.), and **2.63"** west of New Goshen (Vigo Co.). The **8th** saw a third day of appreciable precipitation again trying to alleviate the summer's rainfall deficits, with widespread rains, locally heavy over southwestern counties, lasted through midday before isolated to scattered showers continued through PM hours. The **2.25"** measured near Oolitic (Lawrence Co.) led several **~2.00"** observations found across Martin County, Lawrence County, and eastern portions of Greene County; less-intense local maxima were found in isolated patches near I-70 – **1.04"** west of New Goshen, **1.65"** in Greenwood (Johnson Co.), **1.10"** in McCordsville (Marion Co.), while most other northern counties picked up at least 0.25". Over **4.00"** fell in under 30 hours across

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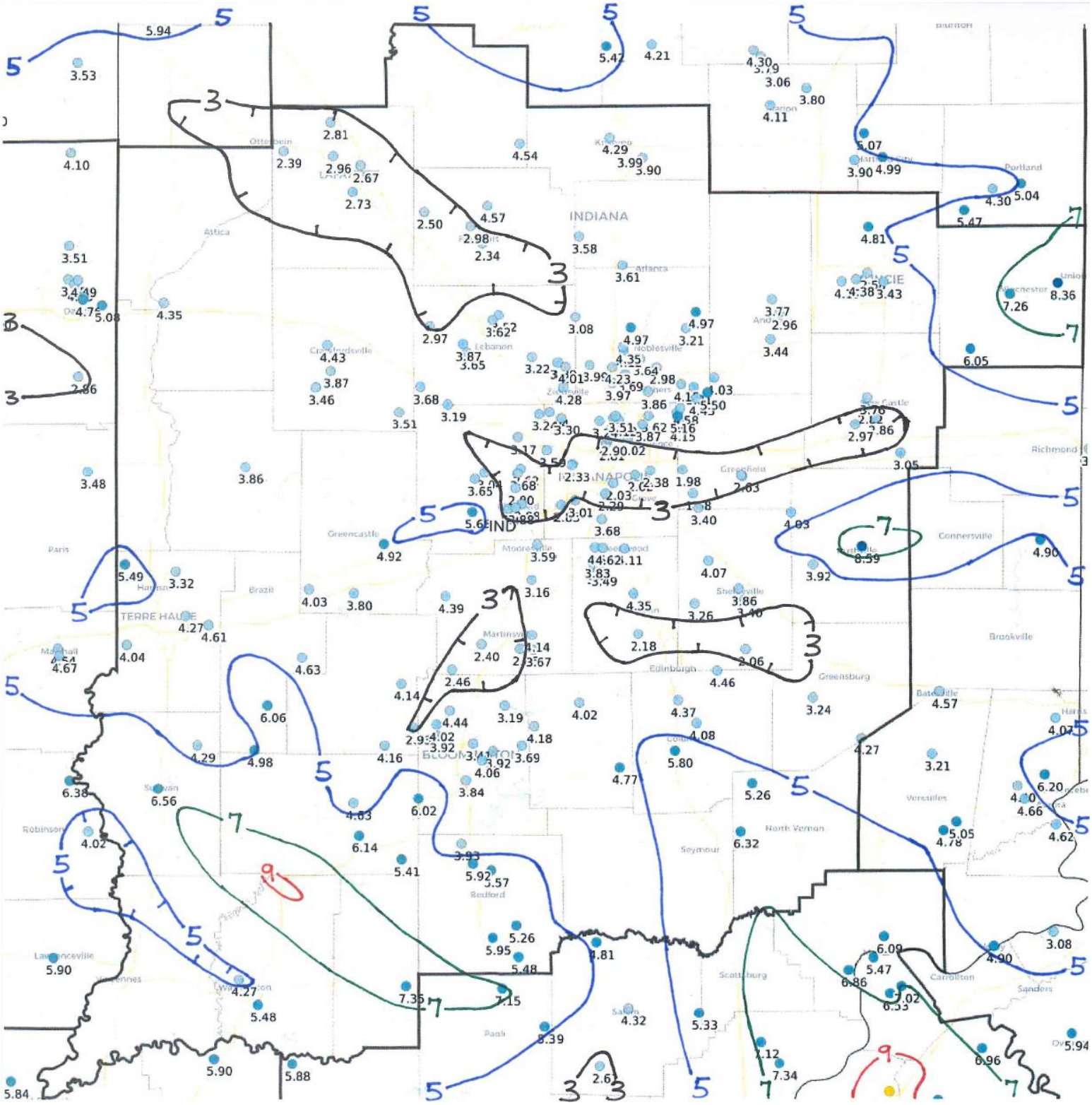
portions of Sullivan County, leading to numerous flooded roads for 1-2 hours during the morning of the **8th**. The final organized showers of the week fell during midday hours on the **9th** – leading to 6-day accumulated totals ranging from generally 0.40-**1.20"** near and north of the I-74 corridor, to mainly **1.50-4.00"** over points southward; extremes ranged from only 0.15" in parts of Anderson (Madison Co.) to **4.33"** in Sullivan (Sullivan Co.) and **4.73"** at the Williams 3 SW (Martin Co.) COOP site; Indianapolis managed 0.89" for the week. The overly-absorbent ground prevented organized river and stream flooding, with only Beaver Creek at Shoals (Martin Co.) flooding for 8 hours during PM hours on the **9th**.

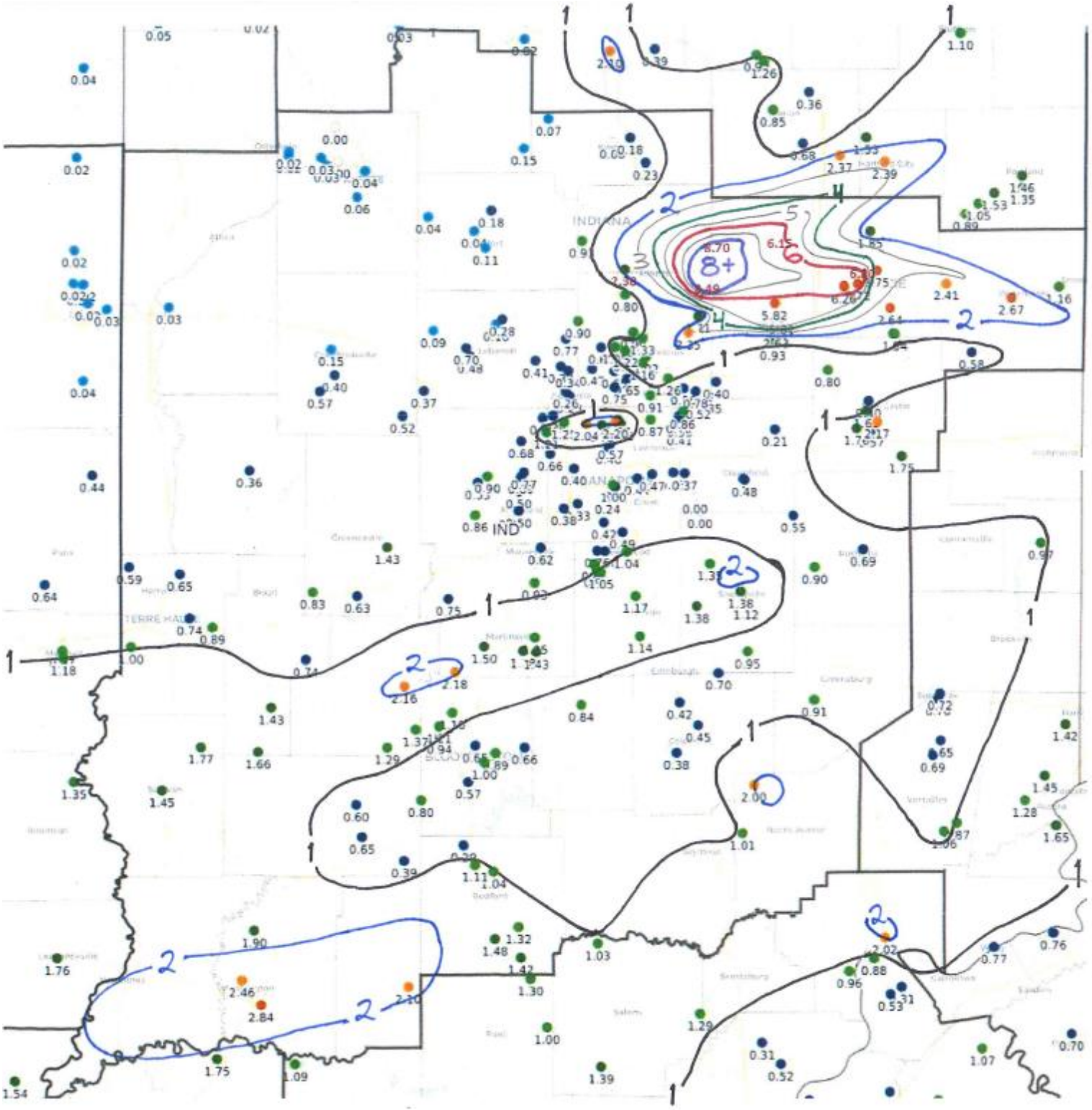
The July **12th** drought monitor update reflected the recent rainfall, as driest conditions (**D1**) continued to be mainly north and west of Indianapolis, while expanding to include most of Delaware and Hancock Counties, as well as southward to include most of the I-70 corridor. **D1** also expanded northward into southern Knox County; however, drought conditions were removed along a ~20-mile wide swath from the Sullivan-Knox County line and eastward, to include most of Daviess, Martin, and Lawrence Counties. Elsewhere **D0** prevailed: primarily from Monroe County into much of southeastern central Indiana. Meanwhile, July's middle week (**10th -16th**) was mainly dry, with scattered light rainfall on both the **13th** and **15th**, which included isolated reports of moderate totals - on the **13th** a rogue thunderstorm brought 0.50-0.65" from Mars Hill to Southport and Greenwood (Marion and Johnson Counties), and on the **15th** 0.73" was observed at both Burlington (Carroll Co.) and in Southport. Rainy conditions then returned for the month's third weekend. The **16th**'s evening showers and scattered, at times strong, overnight thunderstorms brought a total 0.50-**1.25"** to mainly northern Marion County and points north and east, with greatest observations of **1.69"** in Kokomo, **1.39"** west of Morse Reservoir (Hamilton Co.), and **1.42"** at New Castle 3 SW.

On the **17th**, widespread late morning to late day showers and thunderstorms brought 0.50-**1.50"** to most locations, excepting counties to the northwest of the Indianapolis Metro, which again only saw very light rainfall; however, embedded within the various rains were hours of torrential, tropical downpours in afternoon showers over portions of Tipton, Hamilton, Madison and Delaware Counties; after a late-evening lull, further heavy rains fell along southern counties through the late night hours. Greatest totals ranged from **8.70"** in Elwood (Madison Co.), to **8.49"** near Aroma (Hamilton Co.) and **6.26"** in Yorktown (Delaware Co.), while **2.84"** was reported southeast of Washington; other impressive reports across the region included **2.67"** near Winchester (Randolph Co.), **2.20"** in Williams Creek (Marion Co.), and **2.18"** south of Paragon (Morgan Co.). Most impressive were the intense rainfall rates across eastern Hamilton, Madison, and Delaware Counties: **4.70"** fell in under 4 hours in Linwood (Madison Co.), the **8.70"** Elwood total fell in about 12 hours, while the **8.49"** Aroma observation was a 20-hour total. Flash flooding lead to areal flooding across these 3 counties: vehicles were stranded shortly after 400pm on the north side of Muncie, multiple roads were closed across Madison and Delaware Counties by 600pm, with several reports in Delaware County of cars stalled with a few needing assistance or **water rescues**.

June – Mid July 2022 Total Precipitation, Through the Morning of 7/17
As Reported By Central Indiana CoCoRaHS and COOP Observers

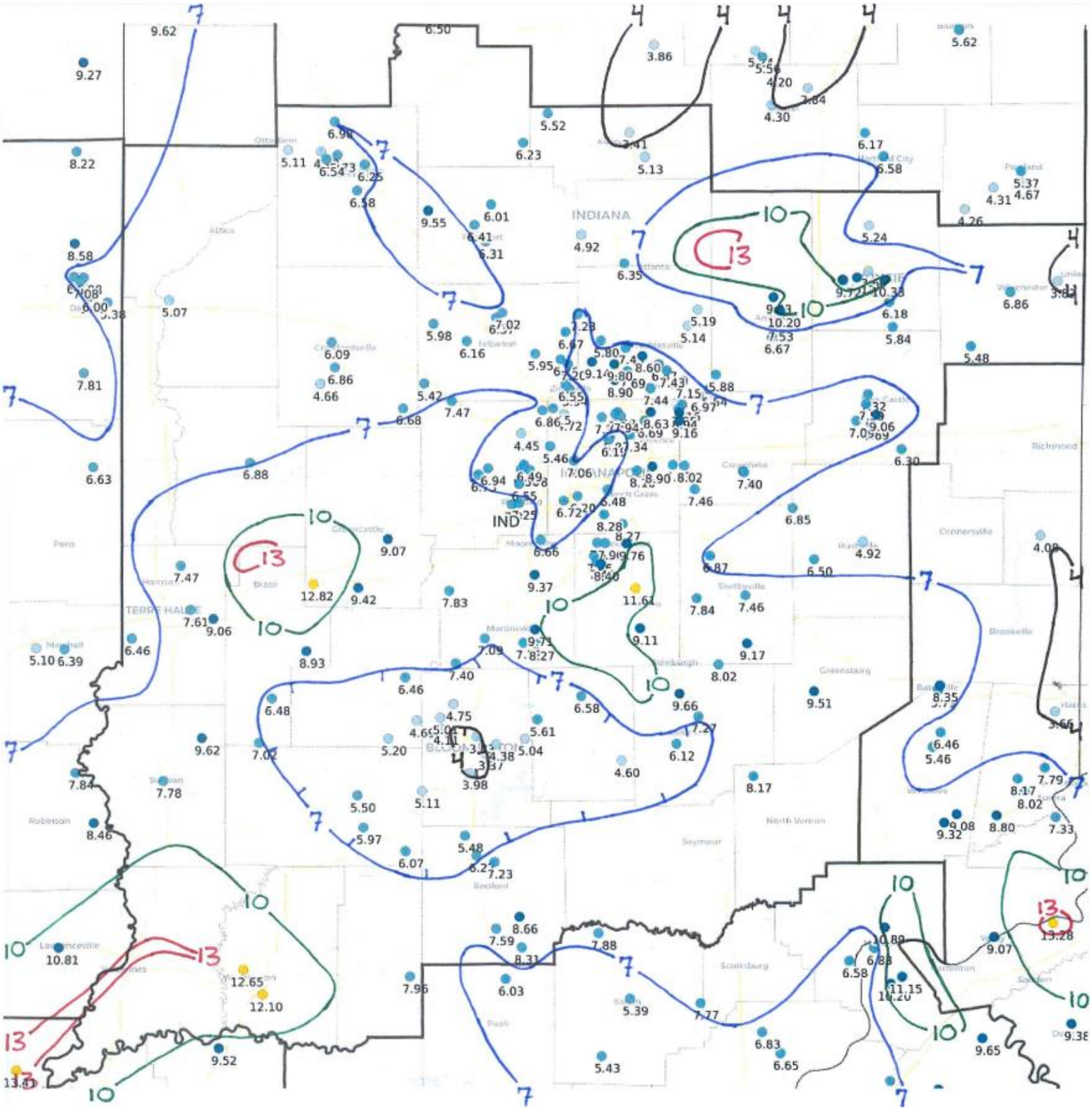


1-Day Total Precipitation, Through the Morning of 7/18/2022
As Reported By Central Indiana CoCoRaHS and Public Observers



For the period 700 AM EDT 7/17/2022 -to- 700 AM EDT 7/18/2022. Data is unofficial.

Late July - August 2022 Total Precipitation, Starting the Morning of 7/17
As Reported By Central Indiana CoCoRaHS Observers



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The White River subsequently flooded on the **18th** at Anderson down to Noblesville, with minor flooding lasting as long as 23 hours near Strawtown before ending by dawn on the **19th**. More impressive flooding was found in northern Madison County: Big Duck Creek at Elwood flooded for almost 1.5 days over the **17th-18th**, with over 12 hours of **moderate flooding** from the **17th** evening through early on the **18th**, and a 11.84' record (since 2016) crest surpassing the old 11.31' record; Pipe Creek at Frankton also flooded through nearly all of the **18th**, cresting close to moderate flood. Not to be outdone, the Mississinewa River at Ridgeville flooded for just over a day during the **17th-18th**, including over 19 hours of **moderate flooding** from late evening of the **17th** through late day on the **18th**.

The July **19th** drought monitor showed improvement in drought conditions as the previous week's broad area of **D1** retreated to roughly only the region's northwestern quadrant, while also still including nearly all of Marion County and immediately along the I-70 corridor from southern Putnam County to far northern Johnson County. Far eastern counties that had been in **D0** the week before had improved to no drought intensity, while **D0** was also removed from most areas south and west of Bloomington.

The **23rd**'s locally potent morning thunderstorms dragged across the region's northern-most counties, with scattered rain lingering here into the afternoon; several locations reported totals near **1.00"** across Carroll and Howard counties, including **1.30"** in Burlington. On the **24th**, several lines of showers and strong to severe thunderstorms crossed the region from north to south as a cold front slowly approached; afternoon rains across the north trended to evening torrential downpours over central and southern zones, with local maximum reports

increasing from north to south. Greatest observations ranged from: several **1.00"+** from central Boone to southern Hamilton counties, including **1.84"** southwest of Westfield (Hamilton Co.); **~2.00"** readings from southeastern Putnam to northern Morgan counties, including **2.21"** in Brooklyn (Morgan Co.); and several **4.00"+** observations prevailing across Knox and Daviess counties, with **6.54"** at Vincennes 5 NE, **5.27"** just northwest of Washington, **5.10"** just south of Plainville, and **4.77"** at the Vincennes 4 E COOP site. Almost as noteworthy was the overly erratic nature of the rainfall's distribution (supporting the month's general trend), with reports of 0.10" just ~10 miles from **2.00"+** readings. A road was washed out by heavy rains along Pine Bluff Road with numerous other roads with high water across the county. Several vehicles were stranded on State Road 67 near Church Road with **water rescues** conducted. Despite these locally very heavy rains, no rivers or creeks flooded, although Smothers Creek near Plainville did crest near bankfull, pre-dawn on the **25th**.

A nearly stationary front near the Ohio Valley, combined with an intermittent low-level jet stream to continue locally appreciable rains through the month's last week. The **25th**'s overnight rains on the **25th**, included moderate to heavy pre-dawn rainfall south and west of Bloomington, with **1.22"** southeast of Washington being the greatest report. The July **26th** drought monitor indicated small improvements across central Indiana, as **D1** continued for most of Marion County and points north and west, while **D0** remained for most other areas north of Bloomington. **D1**, however, was downgraded to **D0** over small portions of Morgan, Parke, and Putnam Counties;

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and **D0** was removed from most of Jackson County, as well as smaller portions of Knox, Lawrence, and Vigo Counties. Locally heavy rains continued through the morning of the **26th**, especially south of Interstate 70, before late night isolated downpours spread northward through the region; 1-day totals through dawn included **2.81"** at Owensburg (Greene Co.), **2.17"** west of Amity (Johnson Co.), and despite mainly light rains across northwestern counties, 0.94" was managed south of Crawfordsville. A similar pattern of diurnal-nocturnally timed rains continued on the **27th**, although rainfall was mainly light, despite **2.65"** east of Flat Rock (Shelby Co.) and **2.00"** north of Scipio (Jennings Co.), while much of the northern Indianapolis Metro neared 1.00". Amid 3+ days in action stage, the White River at Hazleton crept into minor flood for 8 hours during the day on the **27th**. The **28th's** mainly evening rains over central and southern zones led to an additional **1.02"** north of Scipio, with light totals elsewhere south of Interstate 70. 6-day totals for the **23rd-28th** were 2.50" or greater across 15 of the region's, mainly southern counties, including several reports of **7.50-9.05"** in and around Washington, **8.30"** at Vincennes 4 E, and **4.64"** in Owensburg; while farther north **2.63"** was recorded in Carmel, and **2.51"** was reported east of Greencastle (Putnam Co.).

In summary, precipitation frequency was overall near normal, although days with moderate (0.50"+) and/or heavy (**1.00"+**) rainfall were sub-normal at all 1st-order airports, excepting Shelbyville. However, several of these sites did finish well below other observations in their respective counties, namely Bloomington, Terre Haute, and even Muncie's 5.64" monthly total which paled in comparison to several 8.00"+ amounts a few miles farther south and west in Delaware County. Four of central Indiana's COOP stations totaled over 10.00" – **15.01"** at Vincennes 5 NE (the wettest month ever in the site's 40-year record, shattering the old record of 11.61" from March 2011, and the previous July record of 10.67" from 2010); **14.86"** at Washington 1 W (for the 2nd-wettest month in 125 years, behind January 1937, while shattering the previous July record of 13.20" from 1958); **12.98"** at Vincennes 4 E (the 7th-wettest month in 127 years, 2nd-wettest July behind 1958, and wettest overall month since May 1998); and **11.42"** at Elnora (making it the wettest July in the station's fairly short 14-year record). A perhaps more accurate description of July 2022's rainfall distribution would be: mainly near to well above normal across southern counties; and highly variable over northern zones, with particularly dry conditions from the northwestern quadrant into much of Marion County, and above to well above normal rains northeast of Noblesville. July 2022's below normal precipitation at Indianapolis continued the pattern from June 2022's very dry conditions, yet contrasted July 2020 and July 2021's ample totals. The year-to-date total at Indianapolis rose to **22.85"**, while the deficit expanded to **4.85"** below normal. July 2022 was the (tied) **67th driest** in the Indianapolis Area since weather records began in 1871, placing it in the 44th percentile of all recorded Julys.

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Following the release of the new 30-year climatological normals (1991-2020), August has overall trended slightly drier than during the previous 30 years (1981-2010). Greatest downward trends have occurred along the Wabash Valley between Lafayette (-0.34") and Terre Haute (-0.62"), while more modest decreases have occurred farther southeast between Bloomington (-0.18") and Shelbyville (-0.20"); subtle upward trends of +0.10" or less took place within Marion County and at Muncie. The new normals for August rainfall are rather uniform, ranging from 2.99" at Terre Haute to 3.38" at Muncie. Relative to other months, August is normally noticeably drier than April-July as it falls within the transition to a relative minimum in precipitation during September; while August's normal rainfall is comparable to March, October and November, and slightly drier than these autumn months along and south of I-70. Normally collecting more precipitation than the winter months, August ranges from the year's 8th driest month in Marion County and at Shelbyville, to the 5th wettest across the region's northern tier.

On August **1st**, a collapsing, yet still-severe squall line crossed the region after dawn, before late-day cells impacted southeastern counties, and occasional showers and thunderstorms then flowed over southwestern zones through the night. Rainfall totals by the following morning included scattered 0.50-**1.00"** amounts over central counties and reports as great as **1.35"** east of Martinsville (Morgan Co.). The gradual improvement in local drought conditions seen in the U.S. drought monitor's July 26th update continued into the first days of August. The **2nd's** drought monitor update showed **moderate drought** (**D1**) had retreated north of Interstate 70 along southern portions of the Indianapolis Metro, while **abnormally dry conditions** (**D0**) were removed south and east of roughly a Nashville to Rushville line, although **D0** did expand slightly eastward along I-70 from Greenfield (Hancock Co.) to Lewisville (Henry Co.). **D1** continued to prevail across the northwestern quarter of the region.

A rather wet early August continued. The **3rd's** evening squall line was followed by additional overnight rains across western counties, before further showers developed along I-70 during the late night. Widely scattered totals of 0.50-**1.10"** resulted, with **1.32"** west of West Lafayette (Tippecanoe Co.), and **1.08"** at both the Franklin 1 W COOP site (Johnson Co.) and south of Reelsville (Putnam Co.). Rains continued through the morning of the **4th** over many central Indiana counties before scattered afternoon storms formed over southern zones; 1-day observations as great as 0.50-**1.20"** were scattered over central and southern areas, with **1.92"** measured at Crawfordsville 6 SE, and **1.47"** more collected south of Reelsville. Then, a spinning cluster of mainly isolated showers slowly crossed the region during the afternoon of the **5th**, before late-night showers and thunderstorms fell over the Indianapolis Metro and to the south and east; 1-day rainfall was generally lighter than previous days, however areas of isolated 0.90"+ amounts included a **1.99"** report in west-central Jennings County. 5-day precipitation totals for the **1st-5th** were encouraging towards drought relief: 0.50-**2.00"** fell over a solid majority of the region, with lesser amounts around Muncie and immediately west of Bloomington; **2.34"** was collected at Crawfordsville 6 SE, while **2.38"** fell near Hayden (Jennings Co.), and as much as **1.49"** fell near West Lafayette; Indianapolis officially picked-up 0.53" at the International Airport, although around **1.50"** was measured in both Southport (Marion Co.)

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and Cumberland (Hancock Co.). The **6th** found mainly isolated showers and embedded thunder, along and east of the I-69 corridor through the afternoon and evening; heaviest downpours lasted the longest over parts of Henry and Madison counties, although **1.29"** was the greatest observation, southwest of Columbus (Bartholomew Co.). The **7th** was mainly dry between isolated light rainfall; reports over 0.50" were limited to Henry County where New Castle 3 SW collected **1.58"**.

August **8th** was the wettest day-and-overnight of the month's first four weeks, with many locations recording more rainfall than they had in the preceding week. Several rounds of showers and thunderstorms from mid-afternoon through overnight, including a complex of cells over many central counties during several overnight hours, contributed to a general **1-2"** of rain in most of Marion County, as well as into east-central areas and along the I-69 corridor. Greatest 1-day totals ranged from **3.32"** on the north side of Columbus to numerous heavy rain reports across the Indianapolis Metro: **3.20"** southwest of McCordsville (Marion Co.), **3.02"** in Cumberland (Marion Co.), **2.65"** in New Palestine (Hancock Co.), **2.16"** north of Franklin, **2.00"** in Plainfield (Hendricks Co.), and **1.94"** east of Westfield (Hamilton Co.). Several reports around **1.00"** were received between Lafayette and Indianapolis.

The **9th** drought update indicated significant improvement as **D1** shrunk to only portions of Fountain, Parke and Vermillion counties as well as smaller, neighboring portions of Montgomery and Warren counties. Meanwhile there was an overall noticeable improvement to **D0**, as it was essentially removed from south of I-70 and east-central zones, while remaining across most of Hendricks and Marion counties, and actually expanding slightly across northern Delaware County.

As for precipitation on the **9th**, a broad swath of rain continued across the I-70 corridor until dissipating midday; late-day thunderstorms then tracked across southern counties. Numerous reports of an additional 0.50-**1.30"** were found along I-70 and south to Bloomington, with **1.33"** in Clayton (Hendricks Co.), while **1.28"** was observed in Buddha (Lawrence Co.). 2-day totals from this slowly-passing front's combination of diurnal and nocturnal rains included widespread **1-3"** observations, although under 0.25" was prominent along southern-most and a few far northern zones, with **3.76"** and **3.46"** at Columbus and McCordsville, respectively, while Jamestown 2 E and Hymera (Sullivan Co.) picked up **2.53"** and **2.26"**, respectively. The remainder of the month's second week featured several days with light rainfall, whose coverage was scattered on the **11th** and **14th**, but more widespread on the **13th** when **1.10"** was recorded west of Battle Ground (Tippecanoe Co.) and as much as 0.90" was reported around Frankfort (Clinton Co.). Indianapolis picked up another **1.51"** through August's second week. The **16th** drought update found improvement continuing into mid-August with **D1** along the Wabash River transitioning to **D0**, as well as **D0** removed from the Indianapolis Metro. **D0** remained for most northwestern counties, and north-central zones north of a line from Lebanon (Boone Co.) to Alexandria (Madison Co.), which included about 25% of the region.

The month's third week, however, saw a transition to mainly dry conditions; excepting the **20th**, where several rounds of scattered/numerous showers/thunderstorms crossed the region from

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morning to overnight hours, focusing along and especially north of the I-70 corridor. 1-day totals by dawn on the **21st** included scattered 0.50-**1.10"** reports along and west of I-69, with isolated heavier rainfall: **2.35"** in Mulberry (Clinton Co.), and a band from **1.78"** in Farmersburg to as much as **2.30"** in Bowling Green (Clay Co.). The **23rd** drought update showed **D0** expanding to all northwestern portions of the state, although for central Indiana specifically, this translated to a modest increase in **D0** coverage – with only a slight southerly expansion across Boone, Hamilton, Madison, and Delaware Counties. Another rather dry week followed across the region, with widespread rainfall totals under 0.20"; the 0.74" collected west of Cloverdale (Putnam Co.), which fell almost entirely on the **25th**, was the only report over 0.40".

August's precipitation ended on an active note, with appreciable rains for much of the region on the **28th** and/or **29th**. The **28th**'s few afternoon cells were followed by several lines of storms that tracked mainly along and north of the I-70 corridor from the late evening through the overnight. 1-day rainfall by dawn on the **29th** included a broad swath of 0.70-**1.30"** from Terre Haute to Muncie, although lesser amounts fell over the Indianapolis Metro, with **1.51"** east of Rockville and **1.37"** south of Anderson (Madison Co.). The **30th** then featured afternoon storms over southeast counties before a late-day squall line slowly crossed northern and central portions of the region; as the evening wore on, a complex of moderate to heavy showers and thunderstorms continued along and north of the I-70 corridor, before finally tapering off late at night. 1-day totals through dawn on the **30th** showed a local **2-3"** maximum over the Indianapolis Metro and through points to the north-northwest, as well as several **2-4"** reports over west-central zones; greatest observations included **2.89"** in Lawrence (Marion Co.), **3.10"** near Pike (Boone Co.), and **3.39"** on the north side of Carmel (Hamilton Co.); as well as **4.96"** south of Reelsville and **3.39"** southwest of Universal (Vigo Co.). Impressive 2-day totals were led by **3.68"** on the north side of Carmel, **4.45"** southeast of Shepardsville (Vigo Co.), and **6.16"** south of Reelsville (not 20 miles north of parts of Clay County and Owen County that reported 0.30" and less). No river gages reached minor flooding, although Pleasant Run at Arlington Avenue (about 1 mile east of Fountain Square in Marion Co.) crested just below flood at 145 am on August **30th**. Flash flooding was, however, reported 11 miles to the north-northeast on 86th street in Castleton (Marion Co.), as well as across several roads across Vigo County.

The **30th** drought update exhibited a shift in **abnormally dry** conditions from the region's northern to southern counties: northwestern central Indiana finally returned to no drought intensity, although **D0** continued farther east (across Howard County and northern portions of Tipton, Madison, and Delaware Counties). Meanwhile **D0** appeared over roughly the southern 25% of the region: along the US-50 corridor from just east of Vincennes, and essentially all of Greene, Monroe, Brown and Bartholomew counties.

Overall, August precipitation was above normal across central Indiana, with the main patterns of distribution being generally above normal rainfall for many central to northwestern counties, and below normal totals across several southern and far northeastern zones. The **9th** and **29th** combined to hold 55-75% of the month's rain at most sites, with exceptions to this pattern seen at Terre Haute which collected 197% of normal precipitation throughout the month, for the 7th wettest August of the 85 recorded years...and at Bloomington which observed only a combined

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0.18" on these two dates, and finished with only 43% of normal. Muncie also finished the month with sub-normal rainfall, which was led by a meager 0.88" through the **19th**. Precipitation totals varied by a factor of 5 across the region's COOP sites. Reelsville 4 SW (Putnam Co.)'s **9.29"** made for the wettest August in the site's short record (since 1995), while Rockville's **8.01"** was the 5th wettest of their record's 128 Augusts, and the wettest since 1993; Franklin 1 W's **7.35"** was also its wettest August on record (since 2000). Meanwhile, despite anomalously high July rainfall, the driest August since 2017 occurred at both Williams 3 SW (Martin Co.) (1.76") and Vincennes 4 E (1.82"). The spatial distribution of rainfall was nearly a exact reverse from July 2022 regarding drought concerns: as trends here were strong enough to both restore the northwestern quadrant of counties from moderate drought while bringing abnormally dry conditions to several southern counties that had seen widespread 8-14" in the previous month. August 2022's above normal precipitation at Indianapolis contrasted below normal rainfall trends seen in the modest totals of both July 2022 and August 2021. The year-to-date total at Indianapolis rose to **27.29"**, decreasing the year's deficit to **3.61"** below normal. August 2022 was the **40th wettest** in the Indianapolis Area since weather records began in 1871, placing it in the 74th percentile of all recorded Augusts.

Summer 2022 Precipitation Data for Central Indiana Sites

Site	Summer 2022 Precipitation	Summer Season Normal Precip	Diff. From Normal	Greatest Daily Rainfall
Indianapolis Int'l Airport	8.72	12.57	**−3.85**	1.99 on 8/21
Lafayette*	6.53INC	11.76	M	M on 8/30
Bloomington	6.54	13.32	**−6.78**	0.86 on 6/6
Muncie	9.74	12.29	**−2.55**	3.38 on 7/17
Terre Haute	10.95	11.97	**−1.02**	1.25 on 8/30
Shelbyville	12.04	12.22	−0.18	2.65 on 7/17
Indianapolis Eagle Creek AP	7.29	12.59	**−5.30**	1.61 on 8/29

(*) Lafayette's observed precipitation was incomplete during July and August 2022

Severe Weather

JUNE 2022 featured at times frequent, especially around the second week when large hail and/or damaging winds were reported on 4 of 8 days. Days with numerous strong storms that included isolated severe events were more common than organized severe weather, although scattered severe storms did occur on the **8th**, **13th**, and **17th**. **Two weak tornadoes** on the **8th** increased central Indiana's yearly total to 10 tornadoes. The **1st** saw scattered afternoon strong thunderstorms with a few severe reports: winds downed tree branches onto US-31 in Edinburg (Johnson Co.), while hail as large as **1.25"** fell on portions of Lawrence and Bartholomew Counties. Amid several strong storms on the **6th**, **1.00"** hail was reported in Westfield (Hamilton Co.).

The **8th** found the month's most intense weather as ample wind shear fueled afternoon storms: several reports of **1.75" hail** crossed Jennings County, winds downed trees in southeastern portions of both Hendricks County and Brown County, while Rush and Madison Counties each saw one **tornado**. The Rush County **EF1 tornado** lifted occasionally along a nearly 10-mile path from southeast of Gynneville to north of Rushville, throwing debris from damaged homes nearly a quarter-mile, and causing major roof damage at both the Posey Township Volunteer Fire Department and Arlington Elementary School. The Madison County **EF0 tornado** skipped across a 0.6-mile path through Summitville, with several large downed tree limbs damaging a car and home, among scattered minor tree and roof damage.

On the **12th**, strong midday thunderstorms were locally intense, with photographs of **2.00" hail** in Coyuga (Vermillion Co.), a **road washed out** along the northern Parke-Putnam County line, and several trees downed along US-231 just south of Fincastle (Putnam Co.). Another moderate severe event impacted the region on the **13th**: **1.00" hail** and localized **flash flooding** were reported in both Clinton County and Hancock County, with water over Indiana Route 26 at Middlefork (Hancock Co.); while winds downed a few trees from Russiaville (Howard Co.) to east-central portions of Rush County. The morning of the **17th** brought another round of numerous severe wind reports, as trees were toppled across several southwestern counties; Martin County damage ranged from several downed trees along Greenwood Lake to two trees blown onto the Weisbach Community Church in Shoals.

JULY 2022 found eight days of severe weather across central Indiana, including both isolated wind damage through the first week, scattered damaging winds during the third weekend, and three days with localized flash flooding. The **1st** saw a **downburst** produce damaging winds in Rushville (Rush Co.); the **5th** brought minor tree damage to mainly Muncie, including a large tree uprooted into a house; and the **6th**'s pulse storms downed a few trees over both northwestern Rush and western Decatur Counties.

The middle half of July was devoid of severe thunderstorms per se, although heavy to extreme rains caused flash flooding on the **8th**, **17th**, and **24th**. (note details in Precipitation section above). Thunderstorms then brought damaging winds through the month's 4th weekend: mid-morning thunderstorms on the **23rd** caused scattered tree damage across northeastern counties, including downed power lines across Hamilton, northern Madison, and Delaware counties. Widespread

thunderstorms late on the **24th** spawned funnel clouds that were reported over Boone, Hamilton, Putnam and Monroe counties, with multiple reports of winds downing trees and power lines in Greencastle (Putnam Co.); in the early evening, a **69 mph** gust was recorded at the Daviess County Airport northeast of Washington, and multiple trees were downed in Knox County, including one onto a small vehicle in Edwardsport. Significant flash flooding also occurred across Knox County (see details above).

AUGUST 2022's severe weather was led by the **1st'**s squall line, which included essentially all of the month's non-tornadic wind damage reports. This organized west-to-east line of morning thunderstorms tracked from east-central Illinois, across Indiana counties that were parallel to and north of Interstate 70, with strongest winds across the Indianapolis metropolitan area and points east. Reports of downed trees stretched over several counties, including Avon (Hendricks Co.) into the Heatherwood Estates subdivision (west-central Marion Co.) where five homes were damaged by downed trees and limbs. Soon after, winds downed trees into power lines across Carmel (Hamilton Co.), before straight line winds estimated as high as **70 mph** downed trees into homes on the north side of Anderson. A brief gustnado formed over Aqua Gardens Lake (on the leading edge of these strongest winds), lifting a few boards from a pier before tracking roughly one mile over land. An isolated report of even stronger winds came later that evening when a severe cell's estimated **75 mph** gust in north-central Rush County downed multiple trees and also blew a shed into a nearby field.

August's remaining 30 days were nearly devoid of severe weather. The **20th'**s strong afternoon thunderstorms led to a very brief **EF0 landspout tornado** in north-central Randolph County, which blew out an outbuilding's roof. (See precipitation section above for details regarding isolated flash flooding on the night of the **29th**).

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

Miscellaneous Weather

JUNE 2022's at times frequent, yet typically isolated, severe winds once again did not intersect with any of the seven 1st-order airports. However, wind gusts did exceed 40 mph at these sites on a few occasions: Shelbyville recorded 47 mph from the northwest on the **1st**, while the **8th** brought gusts of 45 mph to Indianapolis and 42 mph to Lafayette. Most sites gusted above 30 mph on the **26th**, with Terre Haute reading 41 mph. In contrast, light winds prevailed on the **24th**, with all seven airports' average wind speed under 5 mph.

Fog frequency ranged from 4 days at Muncie to 11 days at Bloomington, while Indianapolis

observed fog on 6 days. The second week was quite foggy, with fog common across the seven 1st-order airports on the **7th**, **8th**, and **10th**; and all sites reporting fog on the **11th**-**13th**. Dense fog was rare – only occurring on the **12th** at Lafayette and on the **13th** at Bloomington, Eagle Creek Airpark, Lafayette, and Muncie.

Thunder frequency was led by 6 days at Indianapolis, with most other sites reporting thunder on 4 or 5 days. Thunder was common across the region on the **12th** and **13th**, yet rare during the remaining 17 days of June.

Humidity extremes were seen between rare, oppressively high dewpoints around **80F** on the **13th**-**14th** and persistent dry heat over the **18th**-**24th**, where relative humidity values often dropped below 30%. On the **3rd**-**5th**, broad Canadian high pressure promoted very dry air at the surface, with minimum daily relative humidity values of 22-24% at most 1st-order sites on the **1st**, before all sites dropped below 25% on the **2nd** – including down to 11% at Muncie and 19% at Indianapolis. Muncie also dropped to 14% and 22% on the **3rd** and **5th**, respectively. The **8th** then found dewpoints climbing briefly into the low 70s across most areas south of I-70.

Widespread **record-setting humidity** began to infiltrate the region on the morning of the **12th**, and while daily maximum dewpoints in the mid 70s or higher were seen through at least the **16th**, the peak daily values were observed on the **13th** - ranging from 77F at Muncie to 81F at Lafayette. All-time highest June dewpoint measurements were set by Terre Haute's 80F (since 1961), Eagle Creek Airpark's 79F (since 1996), and Shelbyville's 80F (since 1998); Lafayette's 81F was the month's highest dewpoint since 2010, while Indianapolis' 78F had not been surpassed in June since 1979. The **14th** saw dewpoints down 2-4 degrees from this peak, with the day's highest readings in mainly the upper 70s (see table above). Dewpoints persisted above 70F for most locations until quickly falling amid a cold frontal zone late on the **16th** / the morning of the **17th**.

The remainder of the month was characterized by generally low daily minimum relative humidity values, especially on the **17th**-**24th**, **27th**-**28th**, and **30th**; Muncie again led the way, recording values of 25% or lower on each of these days, including minimums of 16-19% on the **18th**, **19th**, and **30th**. Indianapolis' driest late days were the **18th** (21%), **24th** (24%), and **28th** (23%).

JULY 2022 greatest wind gust at any of the 1st-order airports was **63 mph** at Muncie on the **23rd**, which ended a 3+ month period with no 50+ mph gusts at any of these sites. Strong gusts were common on the **23rd** with Lafayette recording 45 mph, and Indianapolis reaching their top gust for the month at 41 mph. Also noteworthy were 44 mph readings at Eagle Creek on the **16th**, and Shelbyville on the **17th**. In contrast, scattered throughout the month were 5 days when with no 1st-order site gusted higher than 19 mph – the **10th**, **15th**, **18th**, **26th**, and **30th**.

Fog was frequent for most 1st-order sites, occurring 6 days at Eagle Creek Airpark, and elsewhere from 11 days at Indianapolis to 20 days at Lafayette and Terre Haute. All seven airports observed fog on the **8th**, **17th**-**19th**, and **27th**, with fog also common on the **2nd**, **7th**, **14th**, **16th**, **24th**-**26th**, and **28th**. Lafayette observed fog on every day through the **22nd**-**30th**, while shorter consecutive day streaks occurred at Bloomington on the **24th**-**29th**, Muncie on the **14th**-**19th**, and Shelbyville during the **23rd**-**28th**. Dense fog was somewhat frequent, but not overwhelming given the prevalence of non-dense fog; with frequency outside of Marion County ranging from 1 day at Bloomington (**8th**)

to 5 days at Lafayette (**18th**, **19th**, **22nd**, **25th**, **28th**) and 6 days at Terre Haute (**14th**, **17th**-**19th**, **25th**, **28th**), while Muncie and Shelbyville also reported dense fog on the **17th** and **19th**.

July 2022 thunder frequency ranged from 5 days at Lafayette to 9 days at Indianapolis, with 8 days at Bloomington. Thunder was reported at all 1st-order sites on both the **17th** and **24th**, and most of these 7 locations on the **1st**, **8th**, **16th**, and **27th**. Indianapolis observed thunder on three consecutive days, the **16th**-**18th**.

A few, rather brief, periods of unseasonably low humidity occurred on very warm days (**2nd**, **3rd**¸ **10th**), at 1st-order airports along the region's northern tier and/or within Marion County;. Dewpoints dropped into the upper 40s, with longest durations found at Muncie for 6 hours during the **2nd** PM and 9 hours on the **3rd**, before Indianapolis recorded sub-50F dewpoints, as low as 43F, during the afternoon and evening on the **10th**. Relative humidity values also dropped below 30% at Muncie on the **1st**-**3rd**, as well as 26% or lower at both Marion County airports on the **3rd** and **10th**, including 22% at Indianapolis on the **10th**. Oppressively high humidity was more common, with dewpoints reaching 75F+ at all seven 1st-order sites on the **6th** and **20th**, and at all sites excepting Indianapolis on the **24th**. The **5th** saw dewpoints 75+ at all but Marion County airports, as Shelbyville's dewpoint stayed at 75-78F for 12 hours that morning; Terre Haute upped the ante on the **6th**, ending 21 hours as humid. The **20th**'s tropical blast saw a 79F dewpoint recorded at both Terre Haute and Shelbyville, before Terre Haute observed an 80F dewpoint on the afternoon of the **24th**. Frequency of oppressive humidity ranged from 2 days at Indianapolis to 7 days at Terre Haute.

AUGUST 2022's strongest observed wind gusts at the seven 1st-order airports only exceeded 45 mph on three occasions: **58 mph** at Shelbyville and 50 mph at Indianapolis (both on the **1st**), and then 47 mph at Lafayette on the **29th**. Stronger gusts of 25-40 mph were somewhat common in and near thunderstorms during both the **3rd**-**8th** as well as the **28th**-**30th**. In contrast, scattered throughout the month were 5 days when no 1st-order site gusted higher than 17 mph – the **10th**, **18th**, **23rd**, **24th**, and **27th**.

Fog occurred on 10 days at Eagle Creek Airpark and 14 days at Indianapolis Int'l; although fog was prevalent (occurring on 19+ days) through the month at all other 1st-order sites, , and as many as 23 days (at Lafayette and Shelbyville). All seven airports observed fog on the **1st**, **14th**, **21st**, **22nd**, **26th**, and **30th**, with fog also common on the **4th**-**6th**, **9th**-**11th**, **15th**, **17th**-**19th**, **23rd**-**25th**, and **29th**. Bloomington observed fog on 13 consecutive days during the **14th**-**26th**, while 7-day consecutive streaks occurred at Lafayette on the **20th**-**26th**, and both Muncie and Shelbyville on the **21st**-**27th**. Dense fog was also rather frequent, especially during the month's fourth week: overall frequency was 2-6 days for most sites, although Lafayette observed dense fog on 9 days and Indianapolis' dense fog on the **1st** was Marion County's only occurrence for the month. Dense fog was most common (observed at three 1st-order airports) on the **6th**, **23rd**, **24th**, and **25th**.

August 2022 thunder frequency of 10-11 days was common, with Muncie's 4 days and Bloomington's 5 days being the low outliers. Thunder was reported at all 1st-order sites on both the **1st** and **8th**, and most of these 7 locations on the **3rd**, **9th**, **14th**, **20th**, **21st**, and **29th**. Terre Haute observed thunder on three consecutive days twice, the **7th**-**9th** and **28th**-**30th**.

Indianapolis Summer 2022 Monthly Data

INDIANAPOLIS **JUNE 2022** SUMMARY

	Average Temp	Precipitation	Highs ≥ 90°	Lows ≥ 70°
June 2022	**74.4**	**1.18**	**8**	**6**
Normal June	72.5	4.95	3	5
Diff from Normal	**+1.9**	**–3.77**	**+5**	+1

June 2022 All-Time Ranks...

Temperature: 30th Warmest (Tied)
Precipitation: 8th Driest

INDIANAPOLIS **JULY 2022** SUMMARY

	Average Temp	Precipitation	Highs ≥ 90°	Lows ≥ 70°
July 2022	**78.0**	**3.10**	**10**	**14**
Normal July	75.8	4.42	7	10
Diff from Normal	**+2.2**	**–1.32**	**+3**	**+4**

July 2022 All-Time Ranks...

Temperature: 32nd Warmest
Precipitation: 67th Driest (Tied)

INDIANAPOLIS **AUGUST 2022** SUMMARY

	Average Temp	Precipitation	Highs ≥ 90°	Lows ≥ 70°
August 2022	**75.0**	**4.44**	**6**	**5**
Normal August	74.7	3.20	6	7
Diff from Normal	+0.3	**+1.24**	0	**–2**

August 2022 All-Time Ranks...

Temperature: 46th Warmest (Tied)
Precipitation: 40th Wettest

INDIANAPOLIS SUMMER 2022 SUMMARY

	Average Temp	Precipitation	Highs ≥ 90°	Lows ≥ 70°
SUMMER 2022	**75.8**	**8.72**	**24**	**25**
Normal Summer	74.3	12.57	17	22
Diff from Normal	**+1.5**	**–3.85**	**+7**	**+3**

Summer 2022 All-Time Ranks...

Temperature: 27th Warmest (Tied)
Precipitation: 39th Driest

Fall 2022 Outlook for Central Indiana

The official outlook for the 2022 fall season (September-November) from the Climate Prediction Center, indicates slightly greater chances for **above normal temperatures** across all of Indiana. The outlook also indicates slightly greater chances of **below normal fall precipitation** across the region.

At Indianapolis, the normal fall temperature is **55.6 degrees** and the normal fall precipitation is **9.81”**.

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