Central Indiana
December 2021
Climate Summary

5th Warmest on record at Indianapolis

34th Wettest on record at Indianapolis

Tied for 2nd Least Snowiest on record at Indianapolis

Temperatures

December 2021 was exceedingly mild, averaging 8.5 to 9.5 degrees above normal across central Indiana. This included anomalous warmth on 8 of the month's first 16 days, a seasonably cool week leading up to Christmas, before 8 consecutive unseasonably mild days ended the year. Below normal temperatures were rare, although six consecutive days of near-normal readings occurred during the **17th** - **22nd**. December 2021 continued the last three Decembers' (2018-2020) pattern of above normal temperatures while also exemplifying it, as it was the warmest December since 2015 (which averaged 42.6°F at Indianapolis). December 2021 was the second-warmest at Indianapolis since 1923. By contrast, December 1983 and December 1989's average temperatures were 13.3 and 14.7 degrees below current (1991-2020) Indianapolis normals, respectively. December 2021 was 0.3 to 2.5 degrees warmer than November 2021 at all 1st-order sites, excepting Muncie (0.1°F cooler), this being the first such occasion at Indianapolis since 1959.

The first three weeks' progressive pattern of several upper-level troughs digging across the central U.S., and the resultant storm systems that deepened over the Middle Mississippi Valley before tracking northeastward through the Great Lakes, promoted rather quick temperature changes between near normal and unseasonable to near-record warmth. These abundantly warmer periods were courtesy of several multiple-day stretches of generally southerly winds over the region, as developing storm systems passed to the northwest and then north. Mainly seasonable readings then prevailed for the week preceding the Christmas holiday weekend amid a predominantly zonal upper-level pattern, with slightly below normal temperatures across the northern counties and slightly above normal observations along the region's southern tier. The same unseasonably warm pattern then returned to end the month, with four of the eight final

days of 2021 (the **24th**, **25th**, **27th**, and **31st**) averaging more than 20 degrees above normal for all but the far northwestern corner of central Indiana. Indianapolis recorded a record greatest tally of December days reaching 60F or above, with **11**. Greater frequency of 60F+ days was found at Bloomington (12), Shelbyville (13).

Highs reached the upper 50s to 60s on both December **2nd** and **3rd**, with the highest reported temperatures both days at the Shoals 8 S (Martin Co.) COOP station, 69F and **70F**, respectively. Lows during the **2nd**'s calendar day were highest at the Oolitic Purdue Farm (Lawrence Co.), 47F. On the **5th**, mild conditions returned, as highs in the mid-50s to mid-60s were commonplace, and Shoals 8 S peaked at **67F**. Early on the **6th**, Bloomington's high temperature of 63F occurred just after midnight before a strong arctic cold front crossed the region. Throughout the **6th**, staunch 24-hour temperature drops of about 35 degrees were the rule, and Indianapolis Int'l Airport led this trend, plummeting 38 degrees from 61F to 23F. The subsequent arctic air mass, while only briefly in Indiana, brought the only two days with below normal temperatures within a 22-day period (11/30-12/21) at Indianapolis. The **7th** was the coldest for all of central Indiana as morning lows dropped to 15-20F for most locations, with 13F at the Beck Agricultural Center 6 miles northwest of West Lafayette (Tippecanoe Co.), and **11F** in Rockville (Parke Co.). The **7th**'s high temperatures only reached the mid- to upper 20s, with the lowest maximum at Frankfort Disposal (Clinton Co.), 23F, while Lafayette reached 24F and Indianapolis 26F. These values marked both the coldest morning and coldest daytime for nearly the entire region since the third week of February 2021.

A steady moderation during the second week of December preceded two more brief periods of near-record warmth. Robust southerly winds strengthened late evening on the **10th** before a cold front crossed the region pre-dawn on the **11th**, with strong gusts boosting both temperatures and dewpoints into the anomalously-high 60s across the entire region, while also fueling scattered severe thunderstorms (see below). Shoals 8 S reported the highest mark, **71F**, while 68F was recorded at Terre Haute, Bloomington, Indianapolis – Eagle Creek Airpark, and the Washington 1 W (Daviess Co.) COOP station; all high temperatures were reached during the overnight hours. Indianapolis Int'l Airport's high of 66F at 240 a.m. on the **11th** tied the day's record high (from 1931), yet perhaps more impressive was the rate of (nocturnal) warming – with the mercury climbing 4 degrees over the preceding 2.7 hours of warm winds. Highest minimum temperatures were found for the 1-day periods that ran midnight-to-midnight, with Hardin Ridge Recreation Area (Monroe Co.) and the Seymour 1 WSW (Jackson Co.) COOP station only dropping 51F on the **10th**.

The overall unseasonably mild start to December had one final abnormally warmer period during the **14th**-**16th**, even though readings fell just short of the month's maximum on the 10th-11th for most locations. On the **15th**, high temperatures reaching the low to mid-60's were once again led by Shoals 8 S' **67F**, while Muncie, Shelbyville, Indianapolis – Eagle Creek Airpark, and Washington 1 W all hit 65F. Low temperatures for the **15th**'s calendar day were near 50F, although readings only dropped to 60F at Shoals 8 S for the 1-day period through 700 a.m. on the **16th**. Maximums on the **16th** were near 60F for most locations, with Shoals 8 S and Washington 1 W both reaching **64F**. Indianapolis Int'l Airport was 63F both days.

Seasonably cool weather prevailed during the **17th-23rd** before December closed with the most persistent set of anomalously warm days. More storm systems crossed over, or to the north of the region, promoting stronger southerly winds upon their approach. The Christmas holiday brought the low to mid 60s back to most locations by late evening on the **24th**, with 60s flourishing early on Christmas Day before a cold front crossed the region. Shoals 8 S topped at **74F** on the **25th**…while Indianapolis reached 63F twice, between periods of rain, at both 137AM and 1150AM. This tied 1982 for the 2nd warmest Christmas Day, just behind the record high of 64F (from 1893).

Two more abnormally mild days were in store for most of central Indiana as 2021 came to a close. A warm front advancing north into the region on the **27th** brought the warmest readings of the month, approaching 70F across several southern sites … while 50s held over northern and northeastern zones. On the **31st**, a small surface low sliding east along a stationary front stretched over the region, brought enough southerly flow to boost temperatures into the low 60s along and south of Interstate 70 during the evening. This evening warming gave Indianapolis its 11th 60F+ day in the final hours of the month, passing 1889 for the greatest number on record. However, this record tally of days was aided by several of the rather brief 60F+ periods straddling two calendar days: at Indianapolis the high temperatures on the **5th-6th**, **10th-11th**, and **24th-25th** were all within a couple hours of only three midnights.

December 2021's above normal temperatures continued the warm trend from December 2020, yet were in contrast to the rather cool conditions during November 2021. For Indianapolis, this was only the sixth year since 1871 where December was warmer than November, and the first occasion since 1959. The 1.6°F increase was the greatest such trend since 1889.

Site	December 2021 Average Temp	December 2021 Dep from Nml	Highest Temperature	Lowest Temperature
Indianapolis Int'l Airport	42.1	**+8.8**	66 on 11th	17 on 7th
Lafayette	39.6	**+8.6**	64 on 15th	14 on 7th
Muncie	42.3	**+8.5**	67 on 11th	19 on 7th
Terre Haute	42.4	**+8.9**	68 on 10th, 11th	19 on 7th
Bloomington	43.6	**+9.2**	69 on 27th	21 on 20th, 23rd
Shelbyville	43.7	**+9.3**	68 on 27th	21 on 7th
Indianapolis Eagle Creek	42.4	**+8.9**	68 on 11th	18 on 7th

At Indianapolis, December 2021's daily average temperatures were above normal on an astounding **28 days** and below normal on only 3 days. It was the **5th warmest** December for the Indianapolis Area since weather records began in 1871, placing it in the 97th percentile.

Precipitation

Following the release of the new 30-year climatological normals (1991-2020) earlier this year, December is now typically the second-driest month across most of central Indiana behind February, except for northern counties where January is typically the second-driest. Normally around 2.30-3.30" of precipitation fall across the region in December, which includes a north (drier) to south (wetter) gradient. However, December 2021's totals were above these normal values, with **4.23"** falling at Indianapolis International Airport, **149% of normal**. This was the wettest December at Indianapolis since 2015's 5.59"; with all other 1st-order airports having their wettest December since 2015 or 2018.

Showers and thunderstorms on the night of the **5th** brought 0.50-1.00" to most locations, although southern portions of central Indiana picked up mainly **1.00-2.50"**, with **2.70"** near Scipio (Jennings Co.), and **2.59"** north of Oolitic (Lawrence Co.); patches of isolated **1.00"+** also fell on several of Indianapolis' northern suburbs (led by **1.32"** in Carmel (Hamilton Co.)), as well as Henry and Randolph Counties. **Isolated river flooding** in far southern corners of the region then followed on the **6th**, with Beaver Creek near Shoals (Martin Co.), and both Brush Creek near Nebraska and the Muscatatuck River near Vernon (Jennings Co.), in flood for several hours.

From the evening of the **10th** through early on the **11th**, widespread showers and, at times, severe thunderstorms, dropped 0.50-1.50" on most locales. Several locally heavier rainfall totals were recorded across central and eastern parts of the region, including **1.75"** near Scipio, **1.61"** at both Ellettsville (Monroe Co.) and south of New Castle (Henry Co.), and **1.59"** at the Lebanon 6 W COOP station (Boone Co.).

Many rivers rose again on the **11th**, now following 7-day precipitation totals as high as 2.00-4.00", especially over the southern third of the region. Four sites reached **minor flood** stage: the East Fork of the White River at Seymour was in flood the longest, from early evening on the **11th** through pre-dawn on the **13th**; otherwise, brief flooding began on the morning of the **11th**, with durations ranging from 4 hours on Prairie Creek near Lebanon (Boone Co.) to 15 hours on Flatrock Creek near Raleigh (Rush Co.). The Mississinewa River at Ridgeville (Randolph Co.) only flooded for 12 hours, but crested just shy of moderate flood stage. Action stage was reached on several non-main-stem rivers across eastern and far southern portions of the region, as well as all points along the Wabash River.

A third round of adequate rainfall occurred mid-month, from locally potent overrunning courtesy of a lingering frontal zone, and the associated approaching storm system, all of which slid across Indiana from the morning of the **16th** through midday on the **18th**. The first period of generally lighter rainfall fell from early morning to midday on the **16th**, and brought mainly 0.40-0.70" to central and southern counties, with lesser totals to the north. The storm system's passage up the Ohio Valley saw a second, more impressive, period of rainfall from the **17th**'s PM hours through daytime on the **18th**, with an additional **1.00-2.00"** over southwest and south-central counties and mainly 0.40-**1.10"** elsewhere; the greatest report was **1.90"** at Hymera (Sullivan Co.). Three-day precipitation totals for the entire system included **1.50-2.50"** along southern counties, **1.00-1.50"** along the Interstate 70 corridor, and 0.50-1.00" across most northern zones.

The top 3-day totals were **2.52"** in Hymera (Sullivan Co.), **2.20"** in Ellettsville (Monroe Co.), **1.90"** at the Southwest Purdue Ag Center northeast of Vincennes (Knox Co.), and **1.58"** in Avon (Hendricks Co.).

Minor flooding returned following the mid-month rains, with the White River flooding at Knox County sites for about 3 days each – starting at Edwardsport early on the **19th** and ending at Hazleton late on the **23rd**. The East Fork of the White River flooded again at Seymour for 2.5 days (late on the **18th** until early on the **21st**). Meanwhile Youngs Creek at Amity (Johnson Co.) flooded for just over 10 hours from late day on the **18th** until very early on the **19th**. All Wabash River points rose to action stage (during generally the 18th-23rd), with most, at least briefly, nearing flood stage. Action stage was also reached at all other East Fork points below Seymour, for several days (generally the 20th through the 25th). The week preceding Christmas was the month's lone dry respite, before persistently damp and often rainy conditions returned for the final week of 2021.

From very late on the **24th** through the afternoon of the **25th**, warm and cold frontal passages, from another storm system tracking from the central Plains to the southern Great Lakes, brought generally 0.50-**1.20"** to the central and northeastern half of the region. Locally heavier observations ranged from **1.21"** at the Reelsville 4 SW COOP station (Putnam Co.), to **2.03"** in Kempton (Tipton Co.) and **1.65"** in Muncie. After light rainfall the night of the **26th-27th**, yet another system crossed Indiana on the **28th** – and actually brought the greatest calendar day rainfall for most sites. Seasonably cool temperatures made for a more typical winter-type rain than the several previous systems, with a broad swath of generally 0.70"-**1.20"** along both sides of the Interstate 70 corridor. Greatest reports ranged from **1.39"** southeast of Shepardsville (Vigo Co.) to **1.79"** south of Noblesville (Hamilton Co.). 5-day rainfall totals encompassing the week's 3 events were mainly **1.00-2.00"** across central and northern counties, with several **2.00-2.50"** reports along far northeastern zones; greatest sums were **2.90"** in Kempton, **2.63"** south of Noblesville, and **2.68"** near Eaton (Delaware Co.).

With the assistance of antecedent soil moisture, a few creeks and many river points then flooded. All Wabash River sites flooded from Lafayette (starting late on the **27th**) down to Riverton (Vigo Co.) (starting on the **29th**), with flooding continuing for all of this long segment when the month ended; the crest was at Covington (Fountain Co.) when 2022 began. Other main stem rivers had later, and more sporadic flooding. The East Fork of the White River flooded at Seymour for 30 hours during the **30th-31st**; the White River began flooding at Elliston (Greene Co.), Edwardsport, and Newberry (Greene Co.) on the **29th**, **30th**, and **31st**, respectively. The Mississinewa River at Ridgeville flooded for about 18 hours on two more occasions, following both of the heavier rain events: **25th-26th** and **28th-29th**, with moderate flood stage reached for about 9 hours amid each period. Youngs Creek at Amity also flooded for 15 hours early on the **29th**.

Winter weather was confined to a few light events. A weak clipper-type disturbance passed to the south of the region late on the **7th**, bringing many flurries through the evening and overnight. A few organized snow showers dropped accumulating snow on far southern counties, with as much as 0.6" reported, east of Mitchell (Lawrence Co.). No other frozen precipitation was reported until the **28th**'s mainly cold rain event, which started as a few flakes or ice pellets for a few locations in and near Indianapolis. Wet snow either mixed with rain or was the main

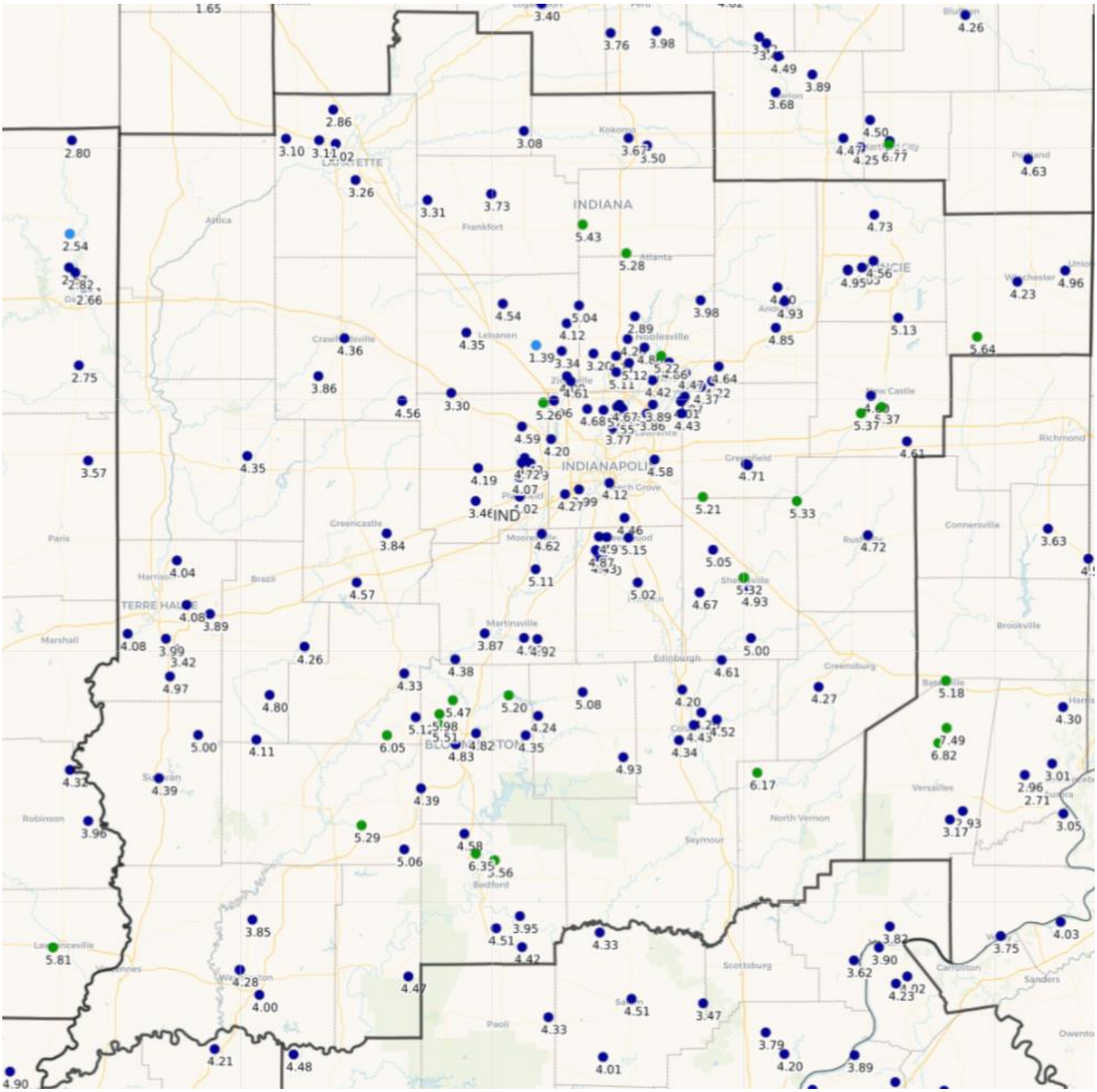
precipitation type over a few far-northern zones, although the warm ground limited accumulations to no more than the 0.3" reported in Burlington (Carroll Co.). Indianapolis' monthly total, a trace, placed the month in the 93rd percentile for least frozen precipitation. This was one of five Decembers since 1889 without measureable snow at Indianapolis, and the first without measurable snow since 1940. Although eight Decembers since totaled only 0.1-0.5 inches, including 0.5" in 2018 and 0.1" in 2014.

December 2021's above normal precipitation was in contrast to November 2021's very dry conditions, as well as other recent Decembers (2016-2020) that were generally near or below normal, (although December 2018 did feature copious precipitation totals across most southern counties). Indianapolis' year 2021 total reached **49.75"**, equating to a **6.12"** surplus for the year. December 2021's frequent, and at times ample, rains led to totals generally 2-3 times those of the dry December 2020, when Indianapolis recorded only 1.63".

Site	December 2021 Precipitation	December 2021 Diff. from Normal	Wettest Day	Longest Dry Stretch
Indianapolis Intl AP	4.23	**+1.31**	0.89 on 28th	6 days, 19th-24th
Lafayette	2.90	+0.61	0.55 on 28th	6 days, 19th-24th
Muncie	3.13	+0.56	0.72 on 28th	6 days, 19th-24th
Terre Haute	3.97	**+1.48**	1.05 on 28th	6 days, 19th-24th
Bloomington	4.52	**+1.23**	0.75 on 11th	6 days, 19th-24th
Shelbyville	5.11	**+2.14**	0.94 on 28th	6 days, 19th-24th
Indy - Eagle Creek	4.21	**+1.54**	1.08 on 28th	6 days, 19th-24th

December 2021 was the **34th wettest** for the Indianapolis Area since weather records began in 1871, placing it in the 77th percentile.

December 2021 Total Precipitation, Through the Morning of 12/31/2021
As Reported By Central Indiana CoCoRaHS Observers



For the period 700 AM EDT 12/1/2021 -to- 700 AM EDT 12/31/2022. Data is unofficial.

Rainfall totals were greatest (5.00”+) across many southern and eastern counties. Minimum values (2.50-3.50”) were spread over several northwestern zones. The entire region was above normal.

Severe Weather

December 2021 was decidedly active for severe weather, with the 10th-11th event reflecting the strong low-level winds that overspread the region when potent storm systems deepened while passing to the north and west of the region.

A line of marginally severe thunderstorms dropped quarter-sized (1.00") hail north of North Vernon (Jennings Co.) at midnight on the **6th**.

Anomalously strong low-level winds, and the resulting vertical wind shear and unseasonably humid conditions, on the evening of the **10th** produced numerous thunderstorms with damaging winds. Severe reports were widespread north of Interstate 70 and scattered to the south, including many downed trees and power lines. The worst damage included grain bins blown over in Kingman (southern Fountain Co.) and trees blown into houses in both Monroe County and Selma (Delaware Co.). The strongest measured wind gusts were 65 mph in northwestern Marion County, 61 mph south of Clarksville (Hamilton Co.), and 59 mph at several 1st-order airports (see below). Isolated sub-severe hail was also observed, with penny-sized (0.75") hailstones west of Carmel (Hamilton Co.). Highest rainfall amounts, around 1.50" led to minor areal flooding in New Ross (Montgomery Co.) and localized urban flooding in Albany (Delaware Co.).

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

Miscellaneous

The **11th**'s thunderstorms brought the month's maximum wind gust (from the west, unless noted) to most airports, including 55 mph at Indianapolis, **59 mph** at both Bloomington (from the southwest) and Muncie, and 56 mph at Lafayette. Terre Haute's peak gust, 51 mph from the south, occurred on the **16th**; Indianapolis and Bloomington also recorded gusts of 51 and 50 mph, respectively, on this date.

Fog was once again common across central Indiana throughout the month, with 1st-order airport frequency ranging from 15 days at Muncie to 21 days at Bloomington. All seven airports reported fog on the **16th** - **18th** , and all sites observed fog on essentially every day from Christmas to New Year's Eve. Dense fog frequency ranged from 2 days at Lafayette to 5 days at Muncie, with all non-Marion County sites recording FG+ on the **10th**, as well as most sites on the **28th** and **31st**. Fog on the night of the **9th**-**10th** was noted as dense by several COOP observers, from Kokomo 3 WSW (Howard Co.) to Perrysville 4 WNW (Vermillion Co.) and Lebanon 6 W (Boone Co.).

Thunder was reported on 3 to 5 days, including all 1st-order airports on the **11th** and most locations on the **6th**, **10th**, and **27th**.

Daily observations from COOP observers included several insightful remarks. On the **4th**, Pence 1 SW (Warren Co.) noted freezing fog. On the **20th**-**22nd** Spencer (Owen Co.) reported frost on three consecutive mornings. At Vincennes 4 E (Knox Co.), the **20th** brought frost so heavy it looked like snow in the moonlight.

January 2022 Outlook

The official outlook for January 2022 from the Climate Prediction Center indicates equal chances of above, below, or near normal temperatures for the region. The normal January temperature for Indianapolis is **28.5** degrees.

The outlook also indicates a greater chance of above normal precipitation for central Indiana. The normal January precipitation at Indianapolis is **3.12**".

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

Questions should be referred to nws.indianapolis@noaa.gov