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Indiana State Climate Office
Monthly Weather Report

Jan 17, 2012

http://www.iclimate.org

December 2011 Climate Summary

Month Summary

What a difference a year makes! A year ago the misery of a harsh, cold, and snowy December marked the start of a winter we would like to forget. In contrast December 2011 hardly seemed like winter at all. This month featured a remarkable lack of snow days, on average just 3 days compared to 23 days a year ago. There were few hazardous weather impacts this month. Those few include residual flooding in northern and southern Indiana due to late November heavy rainfall, a drowning death near Indianapolis in a heavy rain, and numerous minor vehicle accidents with injuries due to a dusting of snow.

Like the month before it December 2011 was an unusually warm month overall. Consider the day split of 8 days with below normal temperatures, no days at normal, and 23 days with above normal temperature. On 12 of these days temperatures were at least 10° above normal. The state average temperature of 36.7° was 5.6° above the month normal and ranks as the 13th warmest December on record. This was our warmest December in 5 years when the state average temperature was 37.3° in December 2006, good for 9th place. Another recent warm December was an average 37.2° in 2001 which ranks as 11th warmest. The highest recorded temperature of the month was 65° on December 15th in Evansville. The coldest reading was 4° at Wanatah on December 10th.

The wet trend of November carried into December as well. The state average precipitation was 4.55 inches, the 16th wettest December on record in Indiana. Three years ago December had more precipitation with 5.13 inches in 2008, the 8th wettest December. Go back another year and the state average precipitation was 5.14 inches, good for 7th place. The wettest December on record hit the 7.04 inch mark in 1990. The December 2011 state average of 4.55 inches is very nearly one and a half times the normal December amount. The heaviest single day precipitation was 3.38 inches measured by the CoCoRaHS observer in Evansville on December 5th. Precipitation fell on about 18 days across the state this month.

Snow fell widely on just 3 days this month as recorded by CoCoRaHS observers in their morning reports of December 9th, 27th, and 28th. The highest snowfall total for the month was 7.4 inches measured by the CoCoRaHS observer in Hudson. Generally 3 to 7 inches fell this month in northern Indiana, 1 to 3 inches in the central section of the state, and less than an inch in the south. An Indiana snowfall total map for December is shown later in this report.

A man was found dead in a ditch in Indianapolis just after a heavy rain on December 21st. This is the only weather related fatality noted for the month. Late November rains resulted in flooding in northern and southern Indiana that continued until December 5th. Vehicle accidents were common

on December 27th after a dusting of snow. Details on these impacts are found in the narratives which follow below.

December 1st – 10th

Thus far this month the upper atmospheric pattern has favored the formation of strong low pressure systems in the Arizona region. This feature causes a fast southwesterly jet stream flow into the Midwest which tends to slow or stall the progress of cold fronts through Indiana.

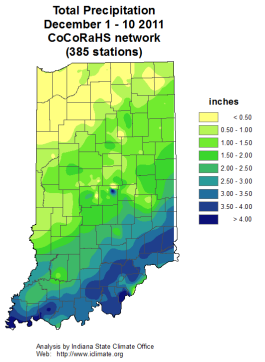
On December 2nd a cold front became stationary over our state. Mixing with warmer air to the southeast the front fizzled the next day. The daily state temperature averaged 3° below normal at the start of this month but over 2 days quickly rose to 6° above normal on the back side of a high pressure ridge east of Indiana. A cold front on December 5th did succeed to pass, returning temperatures to 3° below normal. Another cold front attempt stalled in Indiana on December 9th, but strong high pressure behind it finally pushed the front through the next day. Daily temperatures sank to 8° below normal, the coolest of the period. Despite the ups and downs the daily state temperature averaged right at normal over the 10 days. Usually at the start of December daily maximum temperatures should range from 40° in far northern Indiana to 49° in the southwest. Daily minimums normally vary from 27° to 31° north to south across the state.

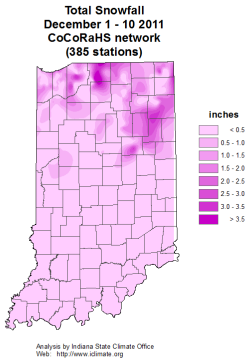
Precipitation only fell on about 3 days of the 10 during the passage of the first cold front. Regional totals over the 10 days averaged about 0.7 inch across northern Indiana, but trended sharply upward to near 1.5 inch in central areas and 2.8 inches in the south. These amounts are near 80% of normal in the north, about 170% of normal in central Indiana, and 240% of normal in southern sections. The heaviest single day amounts occurred in far southwest Indiana. Two CoCoRaHS observers in Evansville noted 3.38 inches and 3.32 inches in their gauges on the morning of December 5th. Two volunteers in Newburgh read 3.31 inches and 3.24 inches while the Boonville observer recorded 3.20 inches that morning. The largest 10 day totals were also tallied in southwest Indiana. Amounts included 4.15 inches and 4.11 inches in Evansville, identical 4.08 inches at two locations in Boonville, and 4.07 inches measured in Newburgh.

Some of the precipitation fell as snow in northeast Indiana. Over the 10 days the South Bend CoCoRaHS observer measured the highest total at 3.5 inches of new snow. The Granger volunteer accumulated 3.1 inches, while 3.0 inches was noted at Fort Wayne, Gas City, and Walkerton. A weekly total snowfall map is shown at the end of this article.

The heavy rainfall at the end of November has combined with additional rainfall this month to produce flooding in multiple areas of the state. On December 1st the city of Fort Wayne had to cope with flooded streets, parks, and 2 flooded homes. The city kept its pumps running to drain overflowing storm sewers and streets. A few days later on December 4th and 5th on the opposite side of the state, some boats moored on the Ohio River capsized due to the heavy rain in recent days. In Lawrence county soils were so saturated that some trees fell over as their root systems gave way! A few state roads were closed there and in Owen and Jackson counties due to the flooding conditions. Residents of Dearborn and Ripley counties in southeast Indiana also faced flooding problems in that area.

At the end of the 10 days flooding had nearly ended in south central Indiana but continued in the southwest. River flooding was expected to persist especially south of US 50 in southwest Indiana into next week.





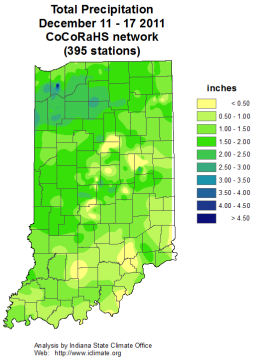
December 11th – 17th

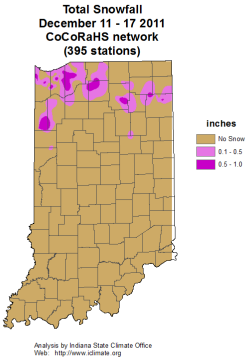
Deep low pressure waves in the upper atmosphere continue to centralize near Arizona this month. This feature tends to steer the jet stream northeastward from this region towards Indiana keeping our temperatures generally mild and precipitation heavier than normal.

This week began dry with daily state temperatures about 3° below normal. Temperatures edged above normal the next 2 days as a large high pressure ridge dominated the eastern half of the country ahead of the next storm system. A strong warm up began on December 14 behind the ridge and saw daily temperatures peak at nearly 16° above normal the next day. The storm quickly passed through and a cold front arrived to end the brief warm spell. Temperatures plummeted to their previous levels at 1° to 2° above normal to close out the week. Overall the midweek warm surge when combined with the moderate weekends averaged about 4° above normal for the week. Normally at this time of year daily maximum temperatures range from about 37° in northern Indiana to 46° in the southwest. Daily minimums typically vary between 24° and 30° north to south across the state.

Nearly all the precipitation this week fell in the very warm air. Total weekly precipitation averaged near 1.8 inch in the north, about 1.3 inch in central Indiana, and 0.9 inch in the south. These amounts are about 3 times normal in northern Indiana and very nearly twice normal in central areas of the state. In southern Indiana total precipitation was slightly higher than normal. The heaviest single day amounts were measured the morning of December 15. The CoCoRaHS reporter at Rensselaer noted 2.39 inches that morning while the Valparaiso observer had 2.34 inches. The Winfield volunteer recorded 2.32 inches while 2.31 inches fell in Hebron and 2.21 inches in Crown Point. For the week Crown Point had 2.80 inches and Hebron totaled 2.74 inches. Two Rensselaer observers had 2.70 and 2.64 inches in their gauges while Hebron summed to 2.58 inches.

Snowfall was light and fell at the end of the week as an Alberta clipper cold front brushed through Indiana to reinforce the cold air behind the earlier front. Up to an inch of snow fell in northern Indiana. Plymouth recorded 1.0 inch on the morning of December 17. Snowfalls of 0.9 inch were measured that day at Munster and Valparaiso while 0.7 inch was noted at Warsaw and Kentland. A map of total snowfall for this week is shown here.





December 18th – 24th

A white Christmas will remain just a dream in Indiana this year. Very warm temperatures this week melted snow cover in our northern counties before Christmas Eve.

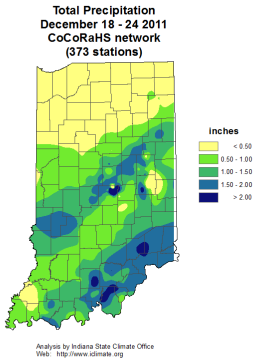
The week opened with the daily state average temperature nearly 10° above normal. The upward trend continued a few more days, peaking at 17° above normal. On December 20th a cold front paused after moving through Indiana, dropping temperatures to 7° above normal. The next day the cold front moved out to the Atlantic. A new Canadian cold front repeated this scene, pulling stationary for a day over Indiana before racing to the Atlantic coast on December 23rd. The pattern tried to repeat once more but failed. The third cold front stalled in Michigan then retreated as a warm front on Christmas Eve. Indiana temperatures ended the week at 6° above normal. Overall this week the daily state temperature averaged about 11° above normal. Typically in the week before Christmas daily maximum temperatures should range from 34° to 43° north to south. Normal daily minimums vary from 20° in far northern counties to 26° in extreme southwest Indiana.

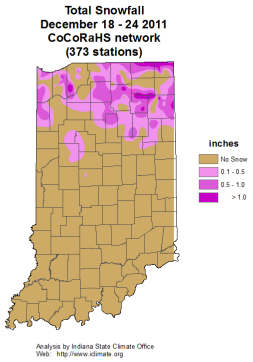
Unlike last week precipitation fell nearly every day this week. A split jet stream flow, a polar branch from Canada and a subtropical branch around the southwest cutoff low center, often merged as a storm track over Indiana. For the week precipitation totaled about 0.3 inch across northern Indiana, 1,1 inch in central counties, and near 1.2 inch in the south. These amounts are about 60% of normal in the north, 170% of normal in central areas, and 150% of normal in southern Indiana. The heaviest precipitation was recorded with the passage of the first cold front. Communities with the heaviest single day precipitation measured the morning of December 21st included 2.08 inches at Palmyra and 1.81 inches in Milltown. CoCoRaHS observers noted 1.79 inches in Paoli, 1.67 inches in New Salisbury, and 1.45 inches in Plainfield. The largest weekly sums were in some of these

same places including 2.31 inches in Paoli, 2.28 inches in Milltown, and 2.08 inches in New Salisbury.

Light snow fell at the start of the week with trace amounts in mid-week. But all snow on the ground had melted before Christmas Eve. An inch of new snow was measured in the northern tier of counties on the morning of December 18th but only trace amounts fell later in the week. The CoCoRaHS observer at Columbia City recorded the largest snowfall summed over 7 days at 1.1 inch. A weekly snowfall total map appears at the end of this weekly summary.

The heavy rain before dawn on December 21st caused flooding problems just north of Indianapolis. Small stream flood advisories were posted for Boone, Hamilton, and Hendricks counties where a quick inch of rain was reported. A man was found dead in a rain swollen drainage ditch on the northeast side of Indianapolis that morning. Heavy fog blanketed parts of Indiana as well and caused school delays in rural areas of the state.



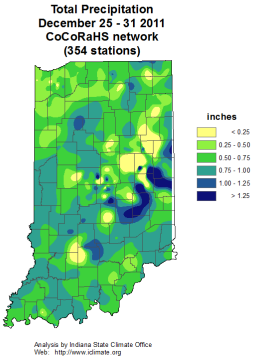


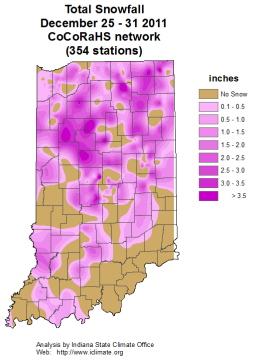
December 25th – 31st

The final week of 2011 overall was very warm despite the passage of 3 cold fronts amid just a single warm front. The generally zonal jet stream pattern moved each front quickly east of Indiana and on its way. The week began with a mild and dry Christmas Day with a state average temperature near 10° above normal. The first cold front of the week raced through Indiana to the Atlantic Ocean in just a day, causing temperatures to fall to 4° above normal by December 27th. A cutoff low pressure center in the upper atmosphere over Texas rejoined the main jet stream flow the next day. This set the stage for the second surface cold front of the week to advance through our state, reinforcing the cold air and lowering temperatures slightly more to 2° above normal, the coldest day of the week. The cold burst was short lived. Warm air in advance of an Alberta clipper system poured into Indiana the next 2 days, lifting temperatures to 13° above normal to end the week and year. Overall for the week temperatures averaged nearly 9° above normal. Usually in this final week daily maximum temperatures range from 35° in far northern Indiana to near 43° in the extreme southwest. Daily minimums should vary between 21° and 27° north to south across the state.

Each of the 4 fronts produced a few tenths inch of precipitation. For the week about 0.6 inch fell across northern Indiana and 0.75 inch in central and southern sections. These totals are about 85% of normal in northern Indiana, 110% of normal in central counties, and right about normal in the southern third of our state. The heaviest precipitation on a single day was measured by the CoCoRaHS volunteer in Princeton with 0.82 inch on December 27th. The next day the Patoka observer noted 0.75 inch while Wakarusa reported 0.73 inch on the last day of the year. The largest weekly totals occurred in central Indiana with two CoCoRaHS reporters in Shelbyville recording 1.23 and 1.05 inch. In Indianapolis the rain gauge there accumulated 1.20 inch.

Most of the snow this week fell across the northern half of the state where up to 3.5 inches was common. The heaviest amounts were measured in west central and northeast Indiana. Atlanta noted 5.0 inches on December 29th while Galveston, Syracuse, and Avon each recorded 3.0 inches on one of the previous two days. The snow map below provides us a picture of this snow pattern.





December 2011

Region	Temperature	Temperature Normal	Deviation
Northwest	34.3	28.5	5.8
North Central	34.4	28.7	5.8
Northeast	34.4	28.6	5.8
West Central	36.1	30.4	5.6
Central	36.2	30.7	5.5
East Central	36.2	30.2	6.1
Southwest	39.9	34.5	5.4
South Central	39.7	34.5	5.1
Southeast	39.0	34.0	5.1
State	36.7	31.1	5.6

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	3.37	2.66	0.72	127
North Central	3.44	2.79	0.65	123
Northeast	3.29	2.68	0.61	123
West Central	4.10	2.96	1.13	138
Central	5.08	2.99	2.10	170
East Central	4.88	2.87	2.01	170
Southwest	5.26	3.53	1.73	149
South Central	5.56	3.56	2.00	156
Southeast	5.98	3.41	2.57	175
State	4.55	3.06	1.49	149

Winter 2011-2012 (same as December)

Temperature

Region	Temperature	Normal	Deviation
Northwest	34.3	28.5	5.8
North Central	34.4	28.7	5.8
Northeast	34.4	28.6	5.8
West Central	36.1	30.4	5.6
Central	36.2	30.7	5.5
East Central	36.2	30.2	6.1
Southwest	39.9	34.5	5.4
South Central	39.7	34.5	5.1
Southeast	39.0	34.0	5.1
State	36.7	31.1	5.6

Precipitation

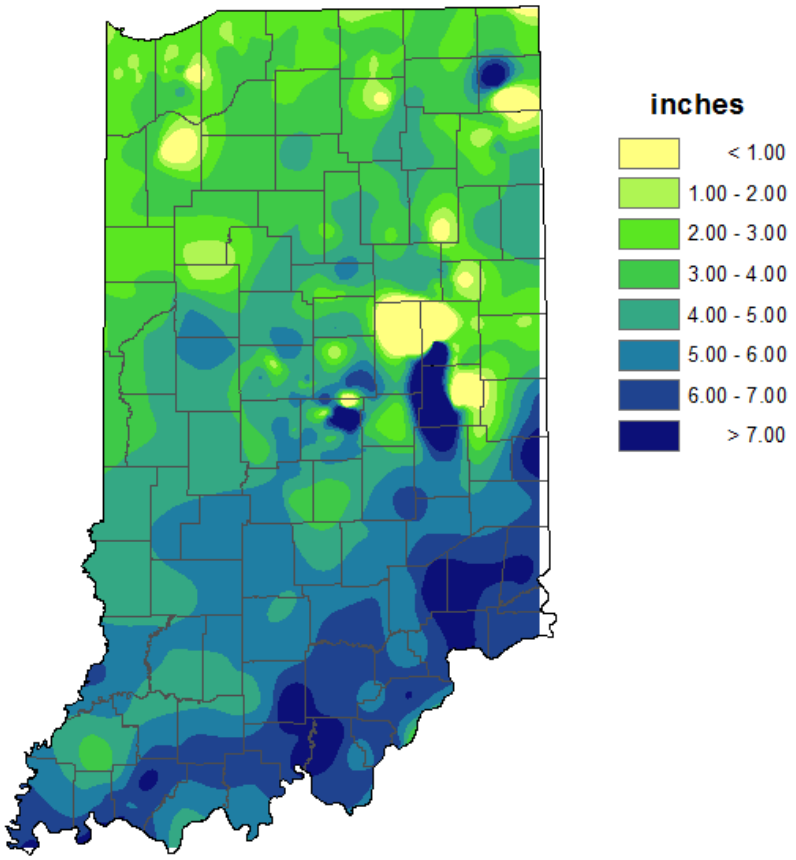
Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	3.37	2.66	0.72	127
North Central	3.44	2.79	0.65	123
Northeast	3.29	2.68	0.61	123
West Central	4.10	2.96	1.13	138
Central	5.08	2.99	2.10	170
East Central	4.88	2.87	2.01	170
Southwest	5.26	3.53	1.73	149
South Central	5.56	3.56	2.00	156
Southeast	5.98	3.41	2.57	175
State	4.55	3.06	1.49	149

2011 Annual

Region	Temperature	Temperature Normal	Deviation
Northwest	50.9	50.2	0.6
North Central	50.7	49.8	0.9
Northeast	50.6	49.5	1.1
West Central	53.0	51.9	1.1
Central	52.9	51.5	1.4
East Central	52.5	50.7	1.8
Southwest	56.6	55.1	1.6
South Central	56.1	54.5	1.6
Southeast	55.2	53.7	1.5
State	53.2	51.9	1.3

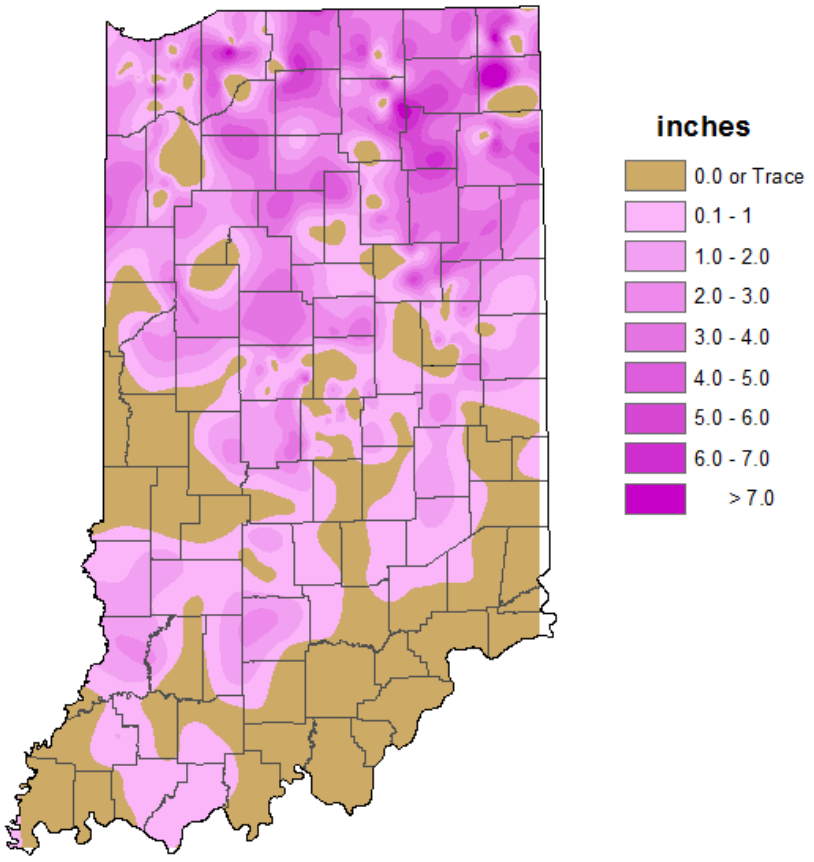
Region	Precipitation	Precipitation Normal	Deviation	Percent of Normal
Northwest	47.19	38.01	9.18	124
North Central	49.06	38.19	10.86	128
Northeast	48.80	36.75	12.05	133
West Central	50.42	41.23	9.19	122
Central	56.28	40.74	15.54	138
East Central	56.89	39.23	17.65	145
Southwest	63.67	45.56	18.11	140
South Central	63.52	45.70	17.81	139
Southeast	65.89	44.12	21.77	149
State	55.65	41.18	14.47	135

Total Precipitation
December 2011
CoCoRaHS network
(384 stations)



Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

Total Snowfall
December 2011
CoCoRaHS network
(384 stations)



Analysis by Indiana State Climate Office
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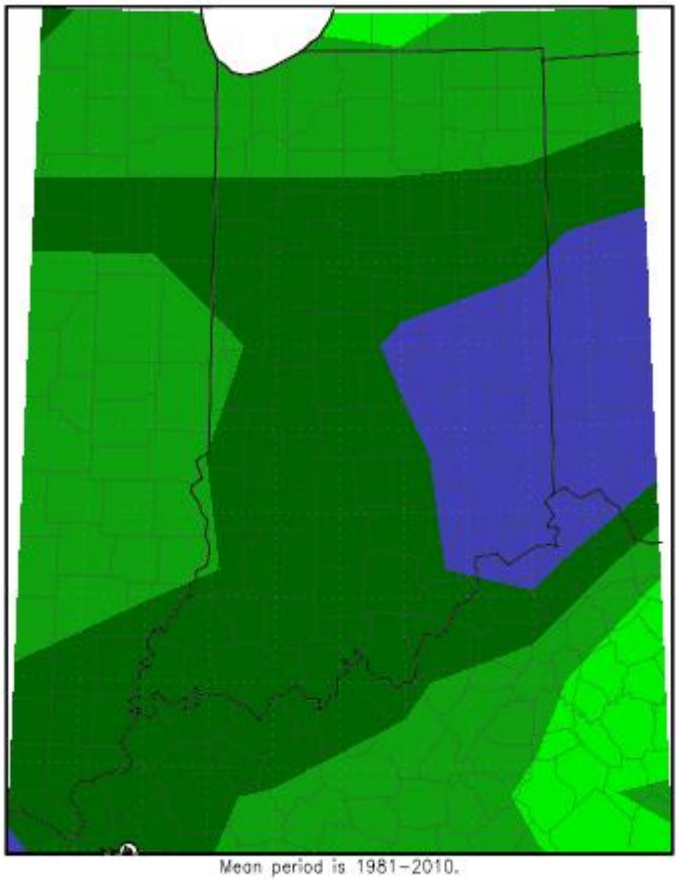
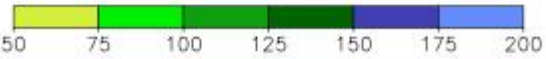
Total Precipitation: Percent of Mean
December 1, 2011 to December 31, 2011

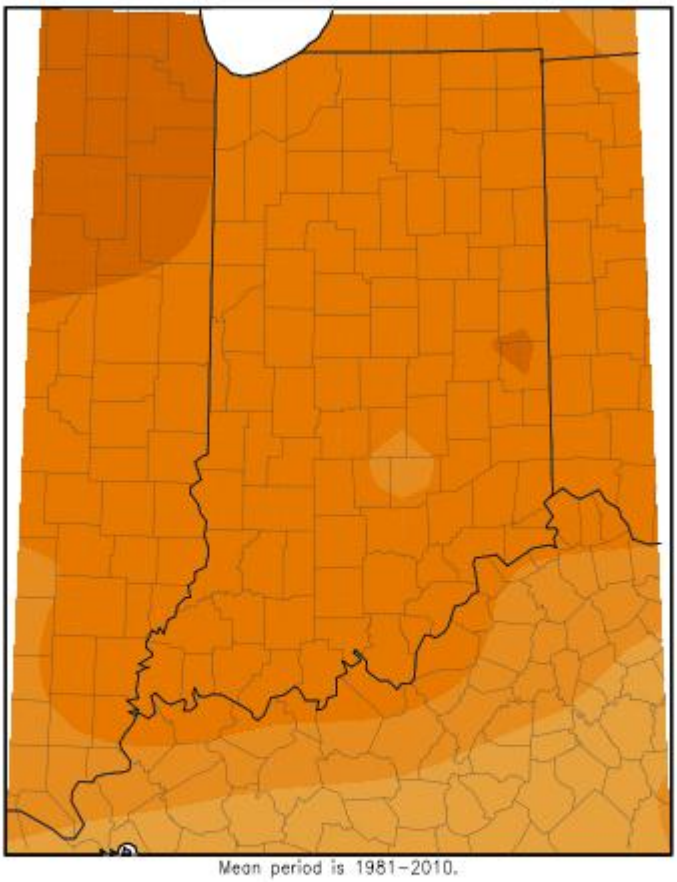


Mean period is 1981–2010.



Midwestern Regional Climate Center
Illinois State Water Survey
University of Illinois at Urbana–Champaign

Average Temperature (°F): Departure from Mean
December 1, 2011 to December 31, 2011



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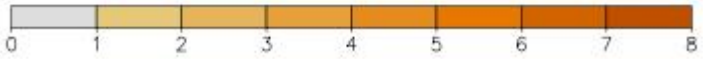

Midwestern Regional Climate Center
Illinois State Water Survey
University of Illinois at Urbana–Champaign

Drought Summary from the U.S. Drought Monitor

Below is a drought summary for the state of Indiana from the U.S. drought monitor. Areas in white are not experiencing any drought. Yellow areas are abnormally dry, but not entirely considered a drought. Drought begins when the moisture levels become more severe, with beige, orange, red, and brown indicating increasing levels of drought (moderate, severe, extreme, and exceptional, respectively). The table below indicates how much of the state is not under drought conditions, and also how much of the state is under drought conditions from its respective column upwards.

For example, December 6th has 0.0% of Indiana under at *least* D1-D4 drought status, 0.0% under at *least* D0 through D4 drought status, and 100.0% drought free. Subtracting the D1-D4 category (0.0%) from the D0-D4 category (0.0%), tells us that 0.0% of Indiana is in D0 category alone (abnormally dry). Please note, however, that these areas are not exact, and much of this drought map has been created from reports throughout the state and in estimation, so use this information as a general view rather than for specifics.

Drought Condition (Percent Area): Indiana

Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
01/03/12	100.00	0.00	0.00	0.00	0.00	0.00
12/27/11	100.00	0.00	0.00	0.00	0.00	0.00
12/20/11	100.00	0.00	0.00	0.00	0.00	0.00
12/13/11	100.00	0.00	0.00	0.00	0.00	0.00
12/06/11	100.00	0.00	0.00	0.00	0.00	0.00

December 6th Drought Summary

December 13th Drought Summary

December 20th Drought Summary

December27th Drought Summary