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Indiana State Climate Office
Monthly Weather Report

Dec 8, 2011

http://www.iclimate.org

November 2011 Climate Summary

Month Summary

The mix of weather events in November often remind us this is a transition month in Indiana from autumn to winter. This month featured the first snowcover of the season in northern counties, a confirmed tornado in southern Indiana, and wind and hail storms throughout the state. An interesting cycle of warm weekends with cool mid-weeks faded late in the month when warm and wet conditions persisted in November's final days.

November 2011 was a very warm month overall. The day split was 7 days with below normal temperatures, 2 days at normal, and 21 days with above normal temperature. On 8 of these days temperatures were at least 10° above normal. The state average temperature of 46.7° was 4.3° above the month normal and ranks as the 9th warmest November on record since 1895. This was our warmest November in 10 years. An average temperature of 49.2° placed 2001 as the 3rd warmest November on record in Indiana. November 1999 was only slightly behind with a state average temperature of 47.8°, good for 5th position in the record books. The highest temperature of the month was 77° on November 14th in Boonville. The coldest reading was 17° at Wanatah just 4 days later on November 18th.

November was also a very wet month. The state average precipitation was 6.25 inches, the 3rd wettest November on record in Indiana. It has been 26 years since we had a wetter November. The 8.28 inches of precipitation which fell in 1985 remains the wettest November in the Indiana record books. The 2nd place number of 6.51 inches was set a very long time ago in 1897. The November 2011 state average of 6.25 inches is about 175% of a normal November amount. The heaviest single day precipitation was 2.92 inches measured by the CoCoRaHS observer in Urbana on November 30th. The largest monthly total in the state was 9.39 inches as noted by the CoCoRaHS volunteer in Evansville. Precipitation fell on about 19 days across the state this month.

Snowfall made its seasonal debut on November 10th, primarily in northeastern Indiana. The second snowfall on November 29th was heavier and more widespread across the state. More than 10 inches of the white stuff covered the ground in spots such as near Lagrange and Peru. Overall in the state the highest snowfall total for the month was 12.7 inches as measured by the CoCoRaHS observer in Lagrange, with 11.1 inches in Albion, 10.3 inches at Syracuse, and 10.1 inches in Millersburg. Generally 10 to 13 inches fell this month in northeast Indiana, and 3 to 10 inches elsewhere across the north. About 2 to 3 inches accumulated in central Indiana and less than 2 inches in southern areas. An Indiana snowfall total map for November is shown later in this report.

On November 14th an EF1 tornado touched down on the west edge of the southern Indiana town of Paoli and traveled two miles to the northeast. No injuries were reported but a 100 year old barn was destroyed and nearby buildings had windows blown in and roofs damaged. Wind and hail damage were noted elsewhere as this storm system traveled across Indiana. More details on this event are found in the weekly narrative below.

While not severe a November 29th storm system caused problems statewide. Flooding in north central and northeast Indiana, high winds in the northwest, and snow in northern and central counties made life miserable for many residents over the next few days. Details on these impacts are found in the narratives which follow below.

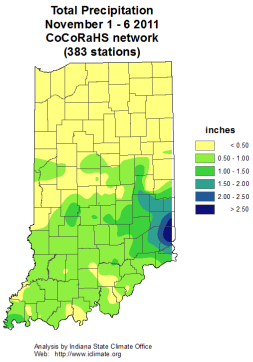
November 1st – 6th

A storm system that passed through Indiana on November 2nd and 3rd brought moderate rainfall to central and southern Indiana with heavy amounts in the far southeast. Otherwise mostly sunny skies filled out the rest of this first week of the month.

The week started cool. Daily statewide temperatures averaged about 4° below normal. Then as warm air ahead of the storm arrived November 2nd, temperatures rose close to normal. The cold front which followed the next day slowed and became stationary over the state, holding temperatures rather steady. On November 4th this storm system raced eastward to South Carolina. High pressure rapidly took its place over Indiana, still with little temperature change. Sunny skies replaced the wet weather to the end of the week, bumping temperatures towards 3° above normal on the last day. The cool start and warm end to the week balanced its average temperatures to right at normal. Typically this first week of November daily maximum temperatures would range from 55° in far northern Indiana to 63° in the extreme southwest. Daily minimums normally vary between 38° and 41° north to south across our state.

The storm this week brought 1 to 2 days of rain to central and southern Indiana but generally skipped the north. Regional totals ranged from about 0.1 inch in northern Indiana to about 0.7 inch in central and southern sections. These amounts are about 15% of normal across the north, near normal in central Indiana, and about 140% of normal in the south. Rainfall was heavy in southeast Indiana as reported on November 4th by CoCoRaHS volunteers. The daily amount measured by two observers in Aurora that morning was 2.42 and 2.07 inches. Nearby in Lawrenceburg 2.08 inches fell. The Moorse Hill reading was 2.05 inches while Osgood noted 1.71 inches. There was only one rain day at these locations so these daily amounts are also the largest weekly totals in the state this week.

The November 3rd storm had intensified greatly over southeastern Indiana but did not produce any severe weather over Indiana this week.



November 7th – 13th

Temperatures rode a roller coaster this week with peaks on the weekends and a valley in mid-week. To add to the excitement parts of Indiana saw their first snowfall and snow cover of the approaching winter season. The week began much warmer than normal. Daily state average temperatures peaked at 15° above normal by November 8th and remained warm for one more day as an approaching cold front stalled and parked for two days just outside the northwest corner of our state. Then on November 10th the cold front marched quickly to the Atlantic coast, allowing much colder Canadian air to rush into Indiana. Daily state temperatures plummeted to 6° below normal as the season's first snow made its appearance in the state.

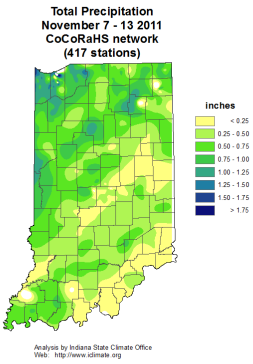
The cold blast was short lived. The jet stream in the upper atmosphere returned to a zonal path which cut off the flow of cold air from Canada. On November 12th temperatures rebounded to 5° above normal as southerly winds from a high pressure center in our southeastern states transported warmth back into Indiana. The strong backside flow continued and temperatures continued to climb to 15° above normal to close the week. Overall for the 7 days daily statewide temperatures averaged about 7° above normal. Typically in the second week of November daily maximum temperatures should range between 52° and 61° north to south across the state. Daily minimums normally vary from 35° in the far north to about 39° in the far southwest corner of Indiana.

Precipitation came in advance of the cold front but little fell after its passage. Regional totals for the week were about 0.7 inch across northern Indiana, 0.5 inch in central, and 0.4 inch in southern areas. These totals are right about normal for northern counties and about half normal elsewhere in the state. CoCoRaHS volunteers in northwest Indiana measured the largest daily amounts on the morning of November 9th. Some of these readings included 1.07 inch in Valparaiso, 1.02 inch at St. John, 0.96 inch in Hammond, and 0.89 inch in Merrillville. Northwest Indiana also noted the highest weekly totals with Hammond leading the way at 1.59 inch. Other weekly numbers were 1.36 inch at New Carlisle, 1.33 inch in Dyer, 1.27 inch in Gary, and 1.23 inch at Hebron.

The first snowfall accumulations of the season occurred in far northeastern counties. On the morning of November 11th more than an inch of snow was observed generally north of a line from South Bend to Warsaw to Auburn. Middlebury recorded 2 inches of snow while 3 inches was noted

in the Lagrange vicinity. Elsewhere a few tenths inch of snow was reported in the central Indiana counties of Tipton, Boone, Hendricks, Marion, and Shelby. Snow pellets were common across the state but there were no other CoCoRaHS reports of accumulation.

It was windy on most days this week as the weather is starting its transition from autumn to winter conditions. High wind warnings were issued across the northeast quarter of Indiana but no damage reports were received. Mostly sunny skies were enjoyed about half the time during the week.



November 14th – 20th

Weather talk a week ago was about the first snowcover of the season in northern Indiana. Just 4 days later the weather turned spring like and featured a confirmed tornado in southern Indiana. The transition from autumn to winter can be a wild weather ride. The swing in daily temperatures this week followed a similar pattern to last week but more extreme, with very warm weekends and a cold middle of the week. A broad trough in the upper atmosphere early in the week intensified over the Midwest and enhanced the cold wave but relaxed into a warmer zonal flow across the country later in the week.

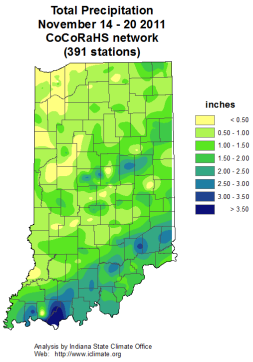
The warmest day of the week came right at the beginning at 17° above normal. A cold air mass reached Indiana on November 15th and temperatures began to fall. A second cold front the next day reinforced the cold push as temperatures crashed, bottoming out at 6° below normal by November 17th. The state average temperature had plunged 23° over 3 days. These fronts picked up speed and raced to the Atlantic Ocean. The high pressure ridge behind the fronts also moved quickly east of Indiana. Now on the backside of this ridge, a warm air flow lifted state temperatures back to normal on November 19th. The warm up continued the next day and the week ended 7° above normal, although the next cold front was poised to enter the state. Overall for the week state temperatures averaged 4° above normal. Normal mid-November daily maximum temperatures range from 50° in far northern Indiana to 58° in the distant southwest. Typical daily minimums should vary between 35° and 38° north to south across the state.

Not only temperature but the timing of precipitation was similar to a week ago. The week overall was wet but nearly all the rain fell during the severe weather event early on. The latter days were generally dry. Rainfall amounts trended heavier southward across Indiana. Regionally about 0.8 inch of precipitation was recorded across northern Indiana, about 1.3 inch in central areas, and near 1.7 inch across the south. These totals evaluate to about 110% of normal in the north, 160% of normal in central Indiana, and 180% of normal in the southern third of the state. CoCoRaHS reporters in southern Indiana noted the heaviest single day amounts as part of the severe weather day. On the morning of November 15th two Evansville observers noted 2.74 and 2.40 inches. At Darmstadt 2.50 inches was measured, with 2.32 inches in Stendal and 2.25 inches at Jasper. The largest totals for the full week included 3.12 inches and 2.74 inches at the two Evansville locations, and 2.78 inches at Darmstadt. In central Indiana the Whitestown CoCoRaHS volunteer totaled 2.78 inches and the Sheridan reporter had 2.69 inches.

Severe weather was reported throughout the afternoon and evening of November 14th, starting in northern Indiana then moving to southern Indiana along with the cold front that evening. One inch diameter hail was reported in the northeastern counties of Whitley and Huntington. Both wind and hail were noted in central Indiana. A funnel cloud was sighted in Tippecanoe county. Small hail was common in this area with up to 1.75 inch hail noted in Clinton county. In Hendricks county winds damaged 6 homes and overturned a semi trailer hauling propane. Trees and power lines fell in this area and westward to Vigo county. High winds were the bigger problem across the southern part of the state. Roofs were blown off in Vanderburgh county, and reports of trees and power lines down came from Orange, Perry, Crawford, and Harrison counties.

An EF1 tornado touched down on the west edge of the southern Indiana town of Paoli and traveled two miles to the northeast. A 100 year old barn was destroyed and nearby buildings had windows blown in and roofs damaged. Part of the roof was torn off the Paoli Police Department. Metal roofs of two shops on the courthouse square were ripped off and chimneys on the county courthouse were damaged. Minor roof and tree damage followed to the northeast. No injuries were reported from this tornado.

Less damage was reported as the cold front marched southward towards Evansville. Hail 1.75 inch in diameter fell at Vincennes. In the city of Evansville a few thousand homes lost power, heavy rain fell, and a metal roof was ripped off the German Township Fire Department.



November 21st – 30th

Earlier this month weather patterns were strongly cyclic with wide swings in temperature and precipitation. In these final days of November there is more persistence of warm temperatures and wet days.

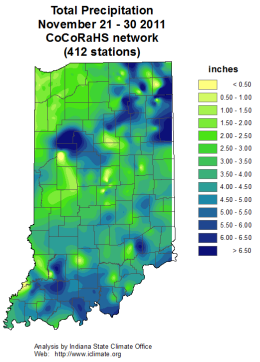
To start the week a storm system rode along a stationary front from Arkansas to Indiana, spreading more than an inch of rain across our state and lifting average temperatures up to 9° above normal. Then a cold front passed through Indiana on November 23rd. A "dirty" high pressure center followed on Thanksgiving Day, suppressing temperatures to about 4° above normal under cloudy skies as moisture from the prior heavy rain became trapped near the ground. This messy system exited to the east late in the day, clearing Indiana skies. A new Midwest ridge warmed temperatures, this time to nearly 13° above normal on November 26th. A second cold front on November 27th dragged temperatures down to just 1° above normal by the next day.

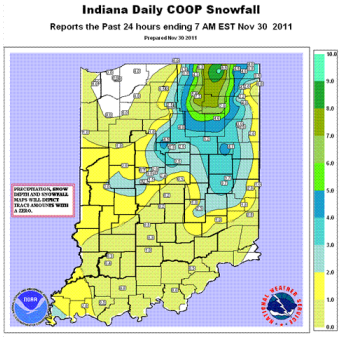
The active pattern continued as a cutoff low pressure center formed in the upper atmosphere and made its way from Arkansas to Ohio. Meanwhile the old cold front at ground level retreated and morphed into an occluded front over Indiana. At the rear of this storm cold air was tapped from Canada, changing rain to snow on November 29th. Finally the next day the cold front moved east, taking the wet weather with it. After this last front temperatures did not recover as before, ending the month at nearly 3° below normal. Yet the overall warmth of these 10 days tallied into a weekly state average temperature of nearly 5° above normal. Typically in late November daily state maximum temperatures should vary between 47° and 56° across the state. Normal daily minimums would range from 32° in far north central Indiana to about 36° in the extreme southwest.

Two to 3 inches of rain fell during the last storm system. Overall for the 10 days precipitation totaled about 3.6 inches in northern Indiana, 3.8 inches in central, and around 4.5 inches across the south. These amounts are near triple the normal over this interval. In northern Indiana precipitation was near 340% of normal, 320% of normal in central sections, and 290% of normal in southern Indiana. Locally heavy precipitation fell in north central Indiana. The single highest daily CoCoRaHS report was 2.92 inches from the Urbana observer. Other isolated heavy amounts included 2.80 inches in Peru and 2.20 inches at North Webster. Over the entire 10 days the CoCoRaHS observer at Butler totaled 6.64 inches, the Urbana observer 6.19 inches, and 6.06 inches fell in the gage at Leopold.

As cold air was wrapped into the storm on November 29th, rain changed to wet snow across northern Indiana. Up to 10 inches of snow fell in northeast Indiana and in Miami county. Among the heaviest CoCoRaHS snowfall totals over the 10 day interval were 9.5 inches at Lagrange and Albion, and 8.8 inches in Millersburg. Some other heavy snow reports were 8.5 inches in Syracuse and 7.0 inches at Columbia City. A snow map based on cooperative station reports the morning of November 30th is shown below.

While not severe the mix of rain and snow on November 29th caused many inconveniences to residents. Up to 22,000 people were without power in northern Indiana as fallen trees took down power lines. Fort Wayne police counted 16 vehicle crashes with 9 injuries and 42 slide off accidents. The city ran 30 pumps in neighborhoods to shuttle away high water. In many cases leaf clogged gutters and sewers could not transfer water off saturated ground before the high water came. Some roads were closed due to high water. In Adams county farms and small rivers flooded and some streets were closed there. Meanwhile in Miami county a state of emergency was declared when highway US 31 was closed for a few hours to clear many accidents involving semi trailers. In Peru up to 7,000 people were without power due to the heavy snow. Nearby Howard, Cass, and Clinton counties were also hard hit. In Tippecanoe county rain had changed to sleet, to snow, and then back to rain at dusk. The poor visibility caused 2 semis to collide on I-65 in nearby Battle Ground and 3 accidents occurred south of Lafayette on a short stretch of US52, one involving a school bus. Some freezing rain was reported in Indianapolis.





November 2011

Temperature

Region	Temperature	Normal	Deviation
Northwest	44.2	40.5	3.7
North Central	44.4	40.4	4.1
Northeast	44.4	40.1	4.3
West Central	46.3	42.1	4.2
Central	46.6	41.9	4.7
East Central	46.4	41.3	5.1
Southwest	49.4	45.4	4.0
South Central	49.1	45.0	4.1
Southeast	48.5	44.3	4.3
State	46.6	42.4	4.2

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	4.10	3.16	0.94	130
North Central	5.18	3.16	2.03	164
Northeast	6.22	3.02	3.20	206
West Central	6.30	3.60	2.70	175
Central	6.02	3.63	2.38	166
East Central	6.35	3.36	2.98	189
Southwest	7.63	4.27	3.36	179
South Central	7.22	4.09	3.13	177
Southeast	7.42	3.70	3.72	200
State	6.25	3.59	2.66	174

Autumn 2011 (September - November)

Temperature

Region	Temperature	Normal	Deviation
Northwest	52.9	52.7	0.2
North Central	52.8	52.2	0.6
Northeast	52.7	51.8	0.9
West Central	54.7	54.0	0.6
Central	54.5	53.6	1.0
East Central	54.0	52.8	1.2
Southwest	57.5	56.8	0.7
South Central	56.9	56.2	0.7
Southeast	56.1	55.4	0.7
State	54.8	54.0	0.7

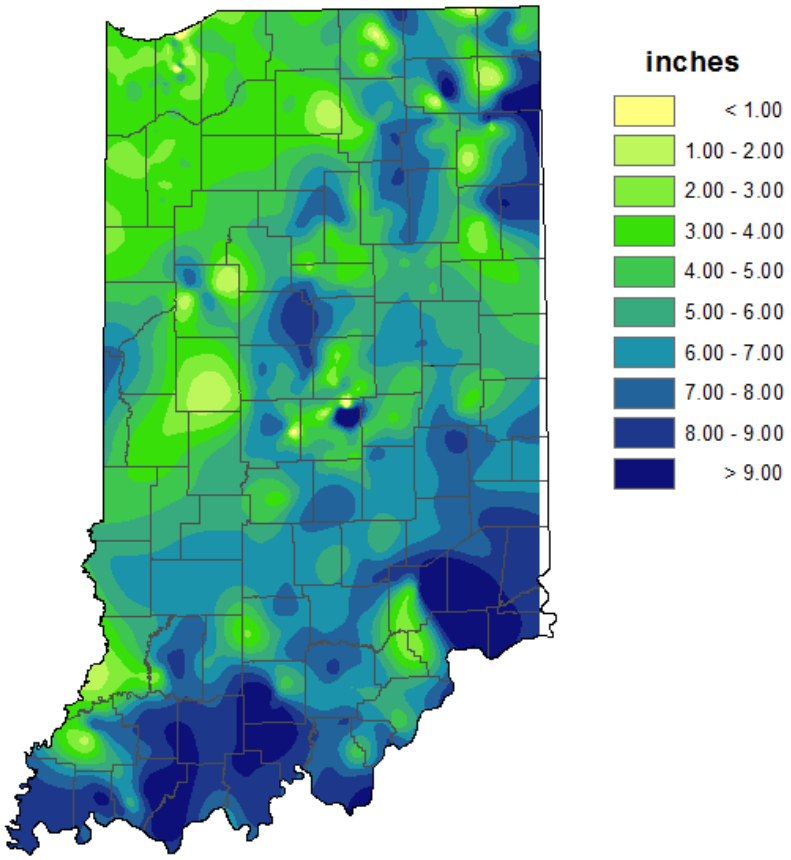
	Precipitation			
Region	**Precipitation**	**Normal**	**Deviation**	**Percent of Normal**
Northwest	11.31	9.29	2.02	122
North Central	14.48	9.41	5.07	154
Northeast	15.86	8.92	6.94	178
West Central	13.55	9.53	4.02	142
Central	14.95	9.44	5.51	158
East Central	15.85	8.88	6.97	179
Southwest	16.49	10.45	6.05	158
South Central	15.69	10.21	5.48	154
Southeast	17.34	9.66	7.69	180
State	14.95	9.58	5.37	156

2011 Annual so far

	Temperature		
Region	**Temperature**	**Normal**	**Deviation**
Northwest	52.4	52.2	0.2
North Central	52.2	51.8	0.4
Northeast	52.1	51.4	0.7
West Central	54.5	53.8	0.7
Central	54.5	53.4	1.1
East Central	54.0	52.6	1.4
Southwest	58.2	57.0	1.2
South Central	57.6	56.4	1.3
Southeast	56.7	55.5	1.2
State	54.8	53.9	0.9

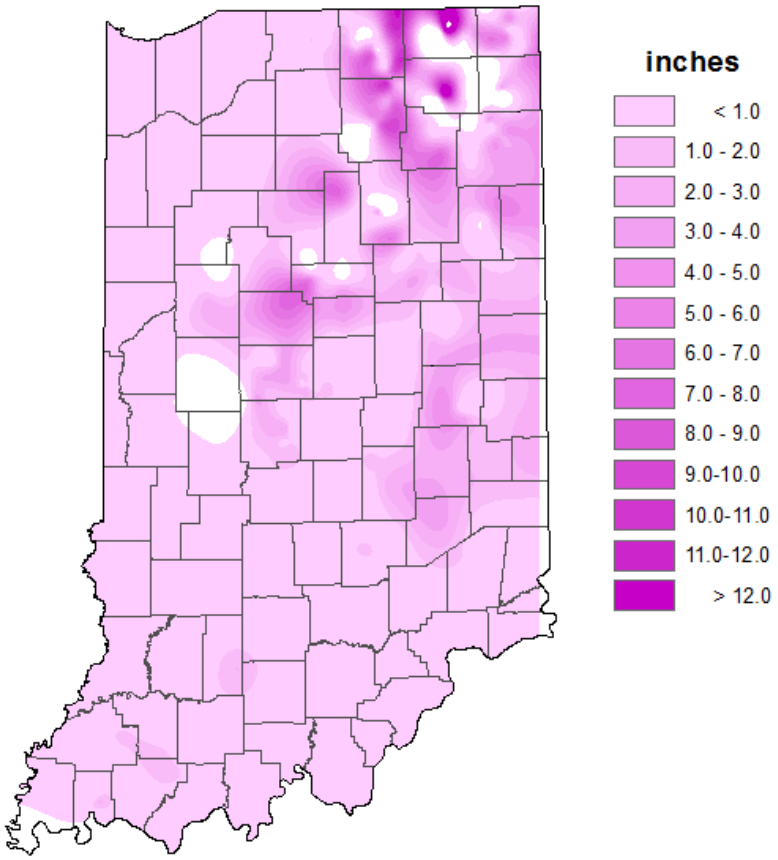
	Precipitation			
Region	**Precipitation**	**Normal**	**Deviation**	**Percent of Normal**
Northwest	43.80	35.36	8.44	124
North Central	45.46	35.40	10.06	128
Northeast	45.52	34.06	11.45	134
West Central	46.37	38.27	8.11	121
Central	51.05	37.75	13.30	135
East Central	51.41	36.36	15.04	141
Southwest	58.51	42.02	16.48	139
South Central	57.99	42.14	15.85	138
Southeast	59.92	40.71	19.21	147
State	51.03	38.12	12.91	134

Total Precipitation
November 2011
CoCoRaHS network
(435 stations)



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

Total Snowfall
November 2011
CoCoRaHS network
(435 stations)



Analysis by Indiana State Climate Office
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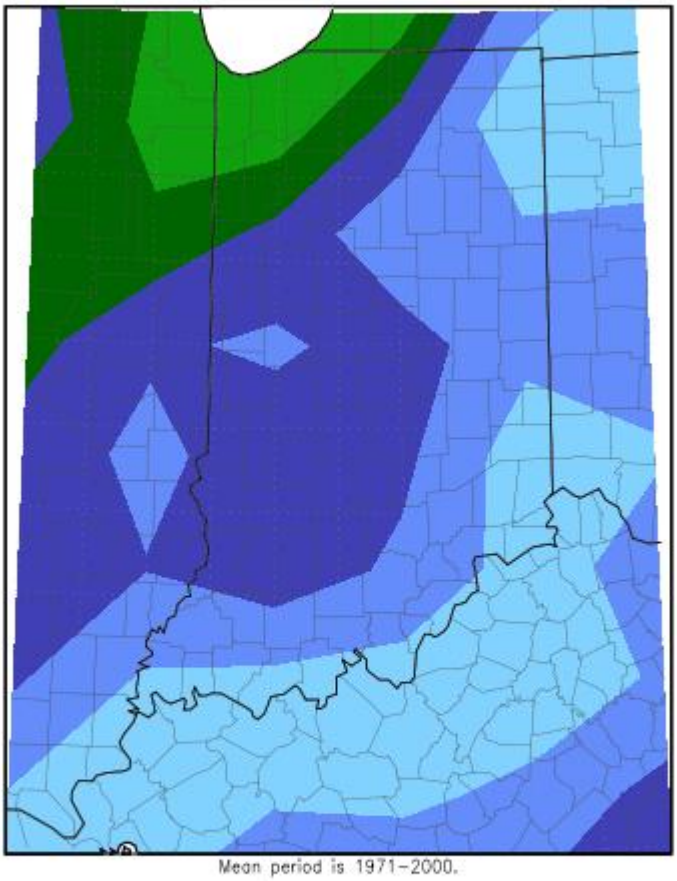
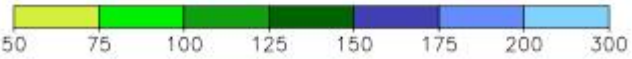
Total Precipitation: Percent of Mean
November 1, 2011 to November 30, 2011

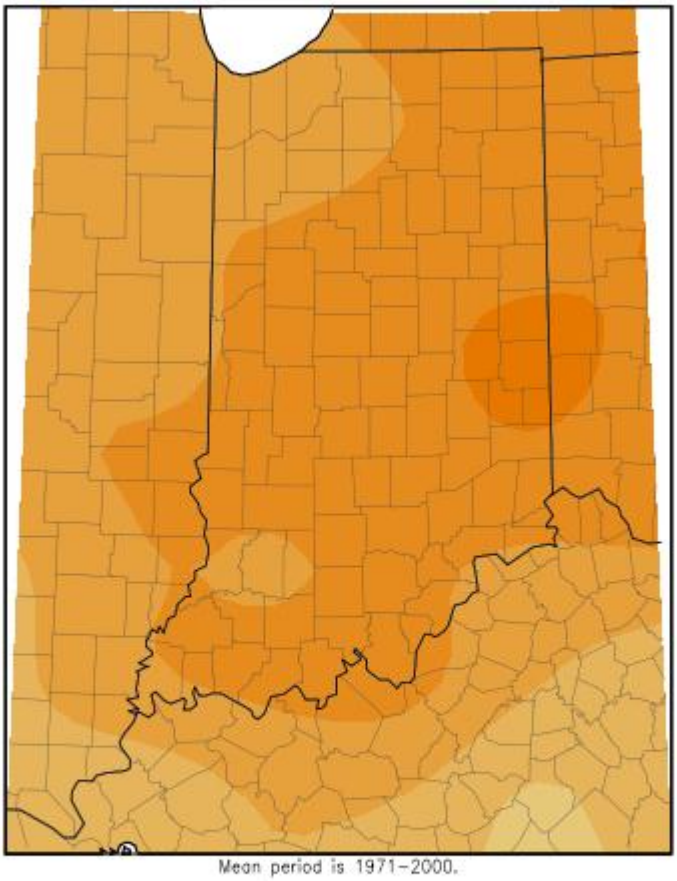


Mean period is 1971-2000.

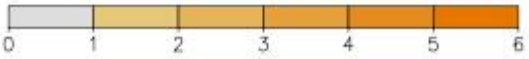


Midwestern Regional Climate Center
Illinois State Water Survey
University of Illinois at Urbana-Champaign

Average Temperature (°F): Departure from Mean
November 1, 2011 to November 30, 2011



Mean period is 1971–2000.



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, November 29th 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
11/29/11	100.00	0.00	0.00	0.00	0.00	0.00
11/22/11	100.00	0.00	0.00	0.00	0.00	0.00
11/15/11	100.00	0.00	0.00	0.00	0.00	0.00
11/08/11	100.00	0.00	0.00	0.00	0.00	0.00
11/01/11	100.00	0.00	0.00	0.00	0.00	0.00

November 1st Drought Summary

November 8th Drought Summary

November 15th Drought Summary

November 22nd Drought Summary

November 29th Drought Summary