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Indiana State Climate Office

Monthly Weather Report

Dec 8, 2015



<http://www.iclimat.org>

November 2015 Climate Summary

Month Summary

November was much warmer than normal while precipitation was very near average. The first and only snow event of the season thus far was significant and arrived on November 21st and 22nd. Snowfall was heavy in 3 northern counties. Lake county dealt with icy roads and interstates as well as power outages when snow laden branches fell on to power lines. The state drought status improved very slightly over the duration of the month. Open burn bans continued in 3 counties. By mid-month the commercial harvest season had ended.

The state average temperature for November 2015 was 4.1°F above normal at 46.5°F, the 9th warmest November on record. This marks the 3rd consecutive month with above normal state temperature. Recent warmer Novembers include 2011 at 46.9°F tied in 6th place with 1984. In November 2001 the state temperature averaged 49.0°F as 3rd warmest. The warmest November on record was 49.1°F which occurred in 1931. The day split in November 2015 was 7 days of below normal temperature, 22 days above normal, and 1 day at normal. There was 1 day when the state temperature was at least 10°F below normal and 8 days when the state temperature was at least 10°F above normal. The highest temperature of the month in the cooperative observer network was 82°F on November 4th at Cannelton. The coldest minimum was 2°F at Lowell on November 22nd.

The November state precipitation average of 3.64" was 0.05" above normal and tied 1913 as the 38th wettest November on record. Three consecutive Novembers in 2003, 2004, and 2005 were wetter than November 2015, posting in the 26th, 16th, and 33rd slots. The November 2010 state precipitation of 5.01" came in 14th place while 6.21" in 2011 was good for 3rd wettest. The wettest November on record was 8.20" in 1985. The highest single day precipitation among cooperative stations in November 2015 was 2.40" recorded on November 10th in Marengo. The highest daily total in the CoCoRaHS network was 2.87" measured on November 28th at Indianapolis 9.5 ne. The highest monthly precipitation in the cooperative network was 7.45" as tallied at Marengo. In the CoCoRaHS network the highest monthly total was 6.46" recorded at Galena 4.3 ene.

Regionally November 2015 precipitation was about 85% of normal in northern Indiana, near 90% of normal in central counties, and around 120% of normal across the south. Normal November precipitation ranges from 3.0" in northeast to 4.3" in southwest Indiana. Widespread precipitation fell on about 11 days this month.

November snow fell over 2 days in one event in northern and central Indiana. The highest monthly snow total in the cooperative network was 9.1" at the South Bend Michiana Airport. In the CoCoRaHS network the maximum snowfall was 9.7" at South Bend 3.3 ssw.

November 1st – 7th

November jumped off to a pleasant start with above normal temperatures all week long. Most of the rain fell during the lone cold front which passed through Indiana on November 6th. There was little change in the state drought status. Open burn bans continued in 3 counties. The 2015 harvest season nearly reached its conclusion this week.

The state average temperature began the week at 2°F above normal. Storm systems were located far north and south of Indiana on November 1st. The next day Texas high pressure galloped into Pennsylvania between these storm centers, establishing a warm southerly wind flow to Indiana. The state temperature rose to 7°F above normal. The ridge sprawled and increased in strength on November 3rd and 4th. The state temperature ramped up to 10° above then 14°F above normal. The northern stationary front now lie over the Great Lakes while the southern front held steady over Florida. The southern front dissolved on November 5th as the Bermuda high migrated into Virginia. Meanwhile the Great Lakes front was forced as a warm front far to the north into Canada. The Indiana temperature soared to 17°F above normal, the warmest of the week. High pressure now dominated the eastern half of the USA.

On November 6th multiple low pressure centers exited Minnesota and joined up in Hudson Bay, exploding in intensity. A long cold front in the Great Plains swept rapidly eastward, crossing through Indiana early that morning. The state temperature cooled slightly to 14°F above normal. By the next day the northern extent of this cold front had reached the Atlantic Ocean while its southern portion was nearing the Gulf of Mexico. Cooler air behind the front rumbled east into Indiana. The state temperature now skidded rapidly to close the week at 3°F above normal on November 7th, returning the state temperature to about where it started.

Overall this week the state temperature averaged to 9°F above normal. Typically to start November the daily maximum temperature should range between 54°F in far northern Indiana to 62°F in the far southwest corner of the state. Normal daily minimums vary between 37°F and 40°F north to south across the state. The warmest temperature of the week among stations in the cooperative observer network was 82°F at Cannelton on November 4th. The coolest temperature in this same network was 28°F at Warsaw and Whitestown on November 7th.

The weekly total rainfall map shows that more than 1.5” of rain fell generally south of a Tell City to Patoka Lake to Logan line. In contrast less than 0.25” was common in an area generally bounded on the south by a Rockville to Decatur line and on the north by a Fowler to Angola line. This region had the lowest totals in the state. The largest single day amounts as recorded in the CoCoRaHS network the morning of November 6th included 1.62” in New Albany, 1.58” at Bright and Aurora, 1.56” in Salem, and 1.48” at Hanover. For the week the highest totals in this same network were 1.84” at Salem, 1.80” in Hanover, 1.79” and 1.75” at two locations near Aurora, and 1.73” outside New Pekin.

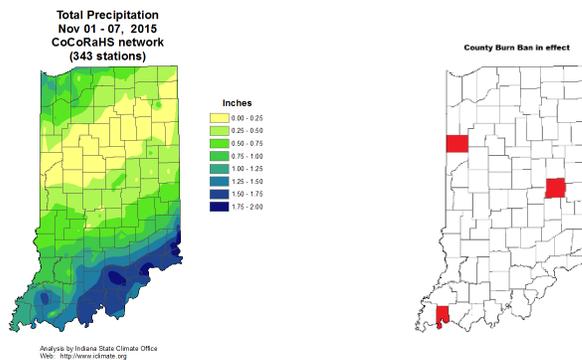
Regionally about 0.4” to 0.5” was recorded in northern and central Indiana while 1.0” was noted in southern Indiana. These amounts equate to about 60% of normal in northern and central counties and 130% of normal across the south.

There was a very small improvement in Indiana drought status between November 3rd and 10th according to the US Drought Monitor. A narrow strip of D0 abnormally dry soils reverted to

normal soil moisture status along a line from about Bloomington to Hazelton. With this change there existed a sharp transition from D1 moderate drought to normal soil moisture status along this line and along the Wabash River south of Hazelton. No other category changes were made. The general result was that about one-fifth of Indiana was classified in moderate drought, a third as abnormally dry, and a little less than half the state in normal soil moisture status for this time of year.

There was no change in county open burn ban status from the week prior. Benton, Henry, and Vanderburgh counties continued with burn bans first declared on October 23rd and 24th.

The November 8th edition of the USDA Indiana crop bulletin stated that soybean harvest in Indiana was now complete. Only scattered fields of corn remained to be harvested for the 2015 crop year. Winter wheat continued to make good progress and some grazing of livestock in pastures continued.



November 8th – 14th

The week began and ended cooler than normal but warm temperatures prevailed in mid-week. Rainfall was about half the normal amount in two main weather events. There was no change in the US Drought Monitor this week in Indiana. Commercial corn harvest finally wrapped up to close out the 2015 growing season.

The core of a massive high pressure center that dominated the eastern half of the country was centered over Indiana on November 8th, allowing for sunny skies and gentle winds. The state temperature began a bit on the cool side at 2°F below normal. The next day the high center slid east to New Jersey and allowed a storm to spill precipitation in southeast states. Indiana remained sunny and dry. The temperature dipped slightly to 3°F below normal, the coldest day of the week.

The southeast storm rode up the Atlantic coast on November 10th and spun off a parallel trough in Ohio, triggering the first main rain event in eastern Indiana counties. High pressure filled the Gulf states behind the departing trough. Warmer air pumped northward by the Gulf high center lifted the Indiana temperature to 1°F above normal. The next day the state temperature ascended to 7°F above normal, the warmest day of the week, as the high pressure core moved closer into Kentucky.

Fronts surrounded a warm dome of air controlled by this ridge sprawled over the east half of the country.

The ridge collapsed on November 12th and scampered quickly to the Atlantic. Multiple storm centers in the Kansas area combined into one strong system over Wisconsin whose cold front whipped across Indiana and generated the week's second main rain event. Temperatures fell slowly at first to 6°F above normal. The cold front outran the storm center the next day by racing far offshore into the Atlantic while the storm center lagged behind in Quebec.

A new high pressure ridge took over the Great Plains and began tapping into cooler Canadian air. The Indiana state temperature edged lower to 3°F above normal. On November 14th the Great Plains ridge slid east to Tennessee, clearing Indiana skies and dropping temperatures to end the week at 1°F below normal.

Overall the cool start and end to the week tempered the warm middle. The weekly state temperature averaged to 2°F above normal. Usually in the second week of November daily maximum temperatures should range between 51°F and 59°F north to south across the state. Daily minimums normally vary between 35°F in far northern Indiana to 38°F in the southwest corner of the state. The warmest maximum temperature for the week among cooperative network stations was 71°F at Cannelton on November 14th. The coolest minimum in this same network was 21°F at Martinsville and Shakamak State Park that same day.

A typical precipitation pattern at this time of year has heavier rainfall amounts near the Ohio River with lighter amounts trending northward. This week the trend was as much west and east. Generally more than a half inch of rain was found east of a line running from Tell city to Jasper, then to Nashville to Indianapolis before ending near Auburn. The heaviest amounts exceeding an inch were summed mostly in Clark, Floyd, Washington and Harrison counties with scattered small pockets in east central Indiana. Lighter amounts of less than a half inch were located in the west half of Indiana except heavier along the state line in Benton and Newton counties.

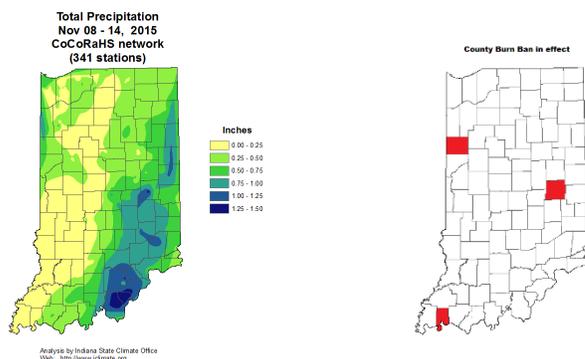
The largest single day amounts in the CoCoRaHS network were recorded during the passage of the trough on the morning of November 10th. These amounts included 1.07" at Galena, 1.06" outside Portland, 1.05" in New Salem, and 1.03" on the edge of Winchester. The greatest weekly sums were tallied as 1.48" near Galena, 1.38" in Floyds Knobs and outside New Castle, 1.36" at New Salisbury, and 1.27" in New Salem.

Regionally about 0.4" of rain accumulated on average in northern and central Indiana and 0.5" in the south. These amounts equate to about 50% of normal in the northern and southern thirds of Indiana and to 40% in the central parts of the state.

There was no change in the drought status of Indiana for the week ending November 17th according to the US Drought Monitor. The heaviest rainfall this week was noted in the eastern half of Indiana. The D1 moderate drought region was located in the western half of the state and did not take advantage of the new moisture. The category coverage numbers remained the same: 21% of Indiana was in D1 moderate drought, 33% rated as D0 abnormally dry, and 46% of the state was in normal soil moisture status for this time of year.

No additional counties declared open burn bans this week. The three existing burn bans were allowed to stand in Benton, Henry, and Vanderburgh counties.

The November 16th edition of the USDA Indiana crop bulletin reported that commercial corn harvesting in Indiana has completed. No further updates from the crop bulletin will be necessary in this weather summary to the end of 2015.



November 15th – 21st

The first snowfall of the season was significant, dumping several inches across northern Indiana. As the week ended November 21st light snowfall continued into the next day in northeast Indiana. State temperatures had peaked on November 18th then fell below normal in the wake of a very strong storm centered over Hudson Bay. Precipitation was recorded nearly every day this week. The heaviest moisture was wrung out during two mid-week fronts. Slick roads and power outages plagued far northern counties during the late week snowstorm.

Indiana skies were sunny and temperatures pleasant on November 15th and 16th with high pressure overhead. The state average temperature stood at 5°F to 6°F above normal. On November 17th the high center slid east to North Carolina, allowing a mature storm in Kansas to push rainfall into Indiana ahead of its cold front, also linked to a second storm in Canada. The Indiana state temperature rose to 10°F above normal. The next day the two storms almost merged. An occluded front from the northern storm reached Illinois while a cold front from the southern storm was close behind in Missouri. The state temperature peaked at 13°F above normal.

On November 19th the two storms finally merged into a powerful single storm just south of Hudson Bay. The occluded front had moved through Indiana the previous night and the trailing cold front roared through early in the morning. Colder air surged into the state behind the fronts and dropped the state temperature to 3°F above normal. On November 20th the fronts joined and raced east into the Atlantic Ocean. High pressure took over the state as cold air poured in. The state temperature fell to 4°F below normal.

Meanwhile another storm had developed over Wyoming. By November 21st this storm had entered Missouri. Moisture overran its stationary front in Kentucky into air near freezing over northern Indiana. The rain quickly turned into snow early that day and began to pile up in northern counties. The state temperature dipped only slightly to 5°F below normal to end the week.

Overall for the week the state temperature averaged to 4°F above normal. Typically for the third week of November the daily maximum temperature should trend from about 47°F in far northern counties to 55°F in the southwest corner of the state. The daily minimum normally varies between 32°F and 36°F north to south across the state. The warmest maximum temperature of the week among cooperative network stations was 72°F at Martinsville 2sw on November 19th. The coolest minimum in this same network was 20°F at Franklin wwtp on November 16th.

Most of the rain this week fell during the passage of the occluded and cold fronts in mid-week. Snow fell in northern Indiana on the last day while rain fell across the south. Regionally about 0.5" of precipitation fell on average across the north, 0.9" in central counties, and 1.8" in southern Indiana. These amounts equate to about 90% of normal in the northern third of Indiana, 130% of normal in central, and 200% of normal across the southern part of the state. The highest single day precipitation in the CoCoRaHS network was recorded in the morning report of November 19th and included 2.31" at Corydon, 2.20" near New Albany, 2.03" at New Salisbury, 2.02" outside New Pekin, and 2.01" near Galena. For the week the greatest total precipitation in this network had 2.83" at Poseyville, 2.63" near New Pekin, 2.60" in the Evansville vicinity, 2.54" at Hazleton, and 2.41" near Galena.

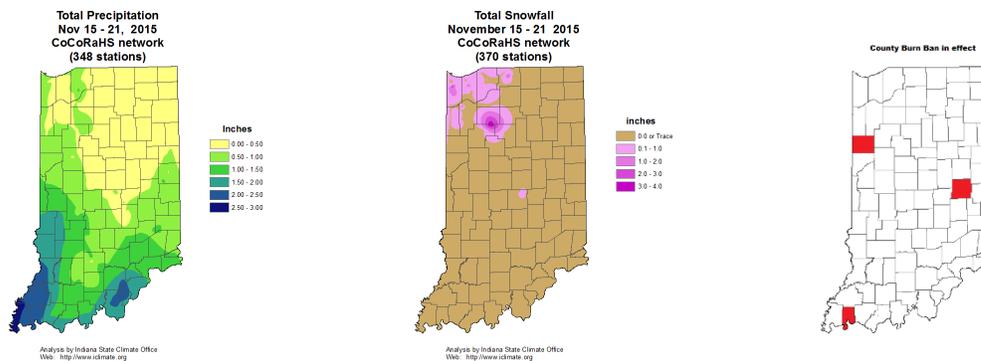
The pattern of precipitation formed a V-shape on this week's map. Less than 0.5" occurred generally east of I-65 between Lake and Johnson counties then north of a Franklin to Portland line. In contrast more than 2" was generally found west of a line from Vincennes to east of Hazleton to Newburgh and in a pocket region inside Floyd and Harrison counties.

Snow began just before dawn and continued much of the day on November 21st. Only amounts received before mid-morning are included in the CoCoRaHS weekly snowfall map below. The rest of the day will be tallied in the November 22nd report. Locally heavy early morning snowfall up to 4" was noted in Pulaski county. Lighter amounts, mostly under an inch, fell generally northwest of a Kentland to South Bend line with very little snow to mid-morning elsewhere across the state.

The snowfall during November 21st with falling temperatures caused icy roads and power outages in Lake county. The outages were caused by branches sagging under the weight of heavy snow. The cities of Merrillville and Michigan City seemed especially hard hit by power outages. Slide offs and spin outs of vehicles traveling I-80/94 and I-65 in northwest Indiana began that afternoon. The Toll Road was affected later on. Lake effect snow continued in Laporte county late into November 21st and continued to cause travel problems into the next day.

The November 24th edition of the US Drought Monitor made only minor changes to Indiana's soil moisture status. Abnormally dry D0 category conditions were removed along the Wabash River in western Posey county. This change did not impact the coverage numbers which remained at 21% of Indiana rated in the D1 moderate drought category, 33% in D0 abnormally dry status, and 46% in normal soil moisture status.

There were no changes in open burn ban declarations in Indiana. Three counties: Benton, Henry, and Vanderburgh, continued with an open burn ban until further notice.



November 22nd – 30th

In the upper atmosphere an intense low pressure system formed over the southwest states during the final days of November. In the first 5 days of this interval the Indiana state temperature soared 28°F as this southwest system kicked very warm air into the Midwest, providing a delightful Thanksgiving Day. A slow cold front finished off the month with cooler wet weather. Unlike the start of the 9 day interval when snow fell in northern Indiana, precipitation fell as rain in the final few days. The precipitation did little to improve the drought situation in southwest Indiana.

Snow was falling across northern Indiana on November 22nd. The state average temperature was unusually cold that day at 14°F below normal. This was the first and coldest of the 9 days.

An intense warmup was set to erupt. High pressure over Texas slid east to Mississippi on November 23rd. Warm air on the backside of this system helped lift the Indiana state temperature to 9°F below normal. A warm front finally passed through the state allowing the state average temperature to reach normal. A weakening cold front that had crossed Indiana dissolved on November 24th. High pressure positioned off the Maine shore kept the warm air coming for two more days, lifting Indiana temperatures to 4°F, then 11°F above normal. By early November 27th several low pressure centers rode atop a strong cold front in Illinois. Indiana remained barely within the sector of warm air. The state temperature peaked at 14°F above normal as heavy rain began to fall.

The cold front crawled through Indiana on November 28th, greatly slowed by the low centers riding northward up the front. The state temperature dropped sharply to 4°F above normal. The cold front nudged south into Kentucky the next day. The Indiana temperature dipped to 3°F above normal but then stabilized. On the last day of November the cold front reached the southeast states. Precipitation ended over Indiana. The state temperature closed the month at 4°F above normal.

Over the 9 day interval the state temperature averaged to 2°F above normal. Usually at the end of November the daily maximum temperature is expected to range between 43°F and 51°F north to south across the state. The daily minimum normally varies between 29°F in far northern Indiana to 33°F in the southwest corner of the state. The warmest maximum temperature among cooperative network stations in the 9 day interval was 70°F at Boonville 1s, Evansville Airport, and Newburgh Dam on November 26th. The coolest minimum in this same network was 2°F at Lowell on November 22nd.

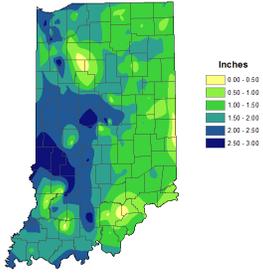
The first snowfall of the season began on November 21st and continued overnight into November 22nd. No snow fell the rest of the month. As shown on the snow map below, north and central Indiana generally north of a line from Terre Haute to Bloomington to Winchester, received snow while rain fell to the south. More than 4" fell mostly north of a Lowell to Peru to Auburn line with heavy snow of 8" or more in St Joseph, Marshall, and Lagrange counties. Among stations in the CoCoRaHS network two South Bend locations measured 9.0" and 8.2" of new snow that morning. A few miles north of Angola, 8.5" was recorded while a Hudson volunteer noted 8.2", Lagrange had 8.0", and Demotte collected 7.8".

Precipitation includes rainfall and the melted equivalent of snowfall. For the 9 day interval Rensselaer tallied 2.63", Carmel had 2.40", a Bloomfield observer summed 2.34", Crown Point had 2.34", and Whitestown noted 2.33". Regionally about 1.4" of precipitation fell across northern Indiana and 1.5" in central and southern Indiana. These amounts equate to about 140% of normal in the north, 130% of normal in central areas of the state, and 110% of normal across the south. While snowfall exhibited the more typical north to south pattern, the precipitation pattern over the 9 day interval trended west to east. The western half of Indiana generally received more than 1.5" of precipitation while the east half received lesser amounts. The heaviest precipitation fell mostly along a Terre Haute to Spencer line which noted more than 2.5" of precipitation over the interval.

There was only a slight change in Indiana drought status this week according to the December 1st edition of the US Drought Monitor. The southern half of Vermillion and Knox counties improved from D1 moderate drought status to D0 abnormally dry. The abnormally dry rating in the northwest corner of Knox county was restored to normal soil moisture status. With these changes the total moderate drought area coverage in Indiana improved by 2% to about 33% of total land area. Overall there was a very slight half percent gain in total area rated in normal soil moisture status at the conclusion of November.

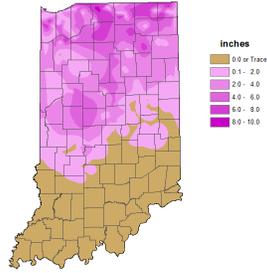
There was no change in open burn ban status. At the end of November counties with open burn bans still in effect were Benton, Henry, and Vanderburgh. This will be the last statement on open burn ban status in Indiana until some change is noted.

Total Precipitation
Nov 22 - 30, 2015
CoCoRaHS network
(318 stations)



Analysis by Indiana State Climate Office
Web: <http://www.icclimate.org>

Total Snowfall
November 22 - 30 2015
CoCoRaHS network
(318 stations)



Analysis by Indiana State Climate Office
Web: <http://www.icclimate.org>

County Burn Ban in effect



November 2015

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	44.0	40.5	3.5
North Central	44.1	40.4	3.7
Northeast	44.1	40.1	4.0
West Central	45.9	42.1	3.8
Central	46.3	41.9	4.3
East Central	46.0	41.3	4.7
Southwest	49.8	45.4	4.4
South Central	49.4	45.0	4.4
Southeast	48.6	44.3	4.3
State	46.5	42.4	4.1

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	3.25	3.16	0.09	103
North Central	2.56	3.16	-0.60	81
Northeast	2.26	3.02	-0.76	75
West Central	3.70	3.60	0.10	103
Central	3.16	3.63	-0.47	87
East Central	2.84	3.36	-0.53	84
Southwest	5.32	4.27	1.05	125
South Central	5.11	4.09	1.02	125
Southeast	4.05	3.70	0.35	109
State	3.64	3.59	0.05	101

Autumn (September - November)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	55.3	52.7	2.6
North Central	55.1	52.2	2.9
Northeast	55.0	51.8	3.2
West Central	56.9	54.0	2.9
Central	57.0	53.6	3.4
East Central	56.4	52.8	3.6
Southwest	59.6	56.8	2.9
South Central	59.2	56.2	3.0
Southeast	58.5	55.4	3.1
State	57.1	54.0	3.1

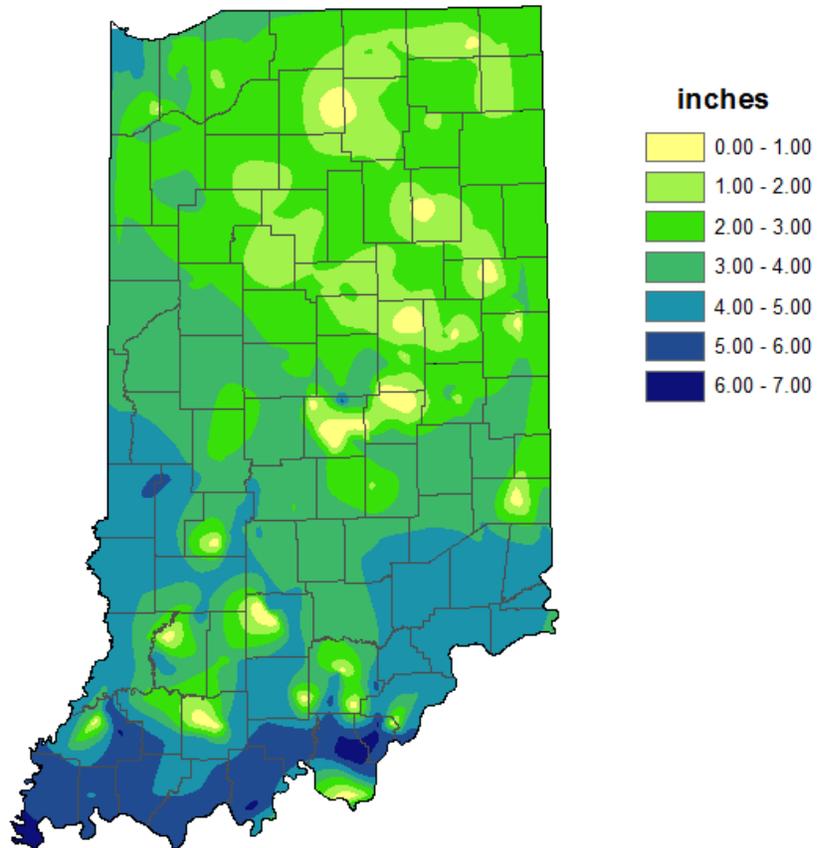
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	8.41	9.29	-0.88	91
North Central	7.10	9.41	-2.30	76
Northeast	6.48	8.92	-2.44	73
West Central	8.09	9.53	-1.44	85
Central	7.65	9.44	-1.79	81
East Central	7.57	8.88	-1.31	85
Southwest	10.31	10.45	-0.13	99
South Central	11.05	10.21	0.84	108
Southeast	10.37	9.66	0.71	107
State	8.56	9.58	-1.02	89

2015 Annual (through November)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	51.3	52.2	-0.9
North Central	50.9	51.8	-0.9
Northeast	50.6	51.4	-0.8
West Central	53.4	53.8	-0.4
Central	53.4	53.4	0.0
East Central	52.7	52.6	0.1
Southwest	56.8	57.0	-0.1
South Central	56.4	56.4	0.0
Southeast	55.6	55.5	0.0
State	53.5	53.9	-0.3

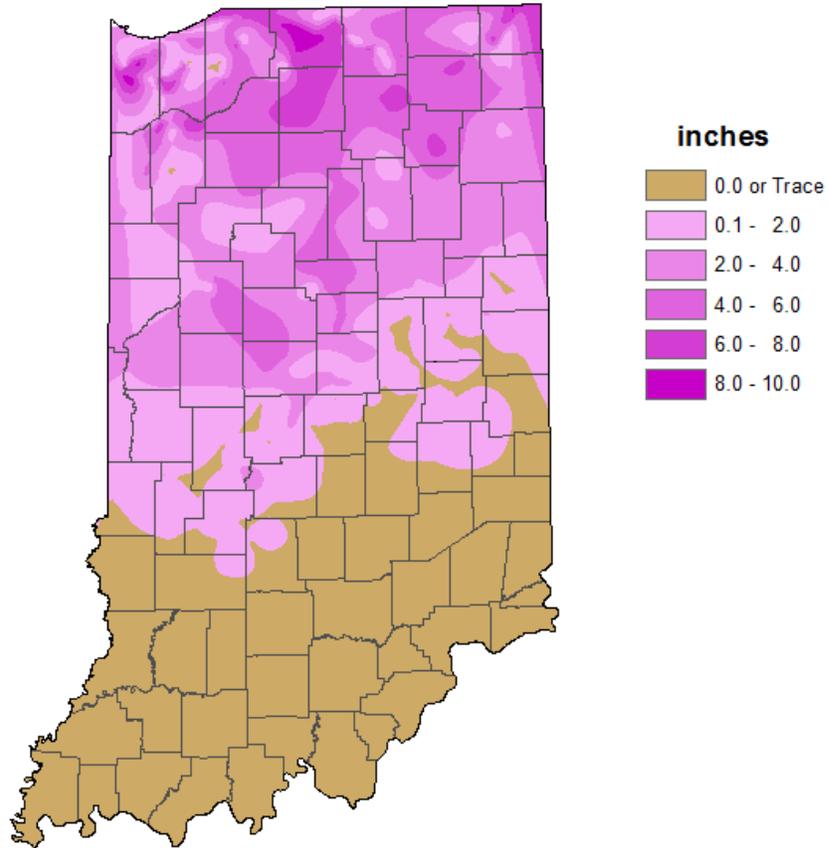
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	38.98	35.36	3.63	110
North Central	36.74	35.40	1.34	104
Northeast	36.86	34.06	2.79	108
West Central	39.97	38.27	1.70	104
Central	41.61	37.75	3.86	110
East Central	41.09	36.36	4.72	113
Southwest	48.51	42.02	6.49	115
South Central	51.21	42.14	9.07	122
Southeast	46.84	40.71	6.13	115
State	42.50	38.12	4.38	111

**Total Precipitation
November 2015
CoCoRaHS network
(366 stations)**



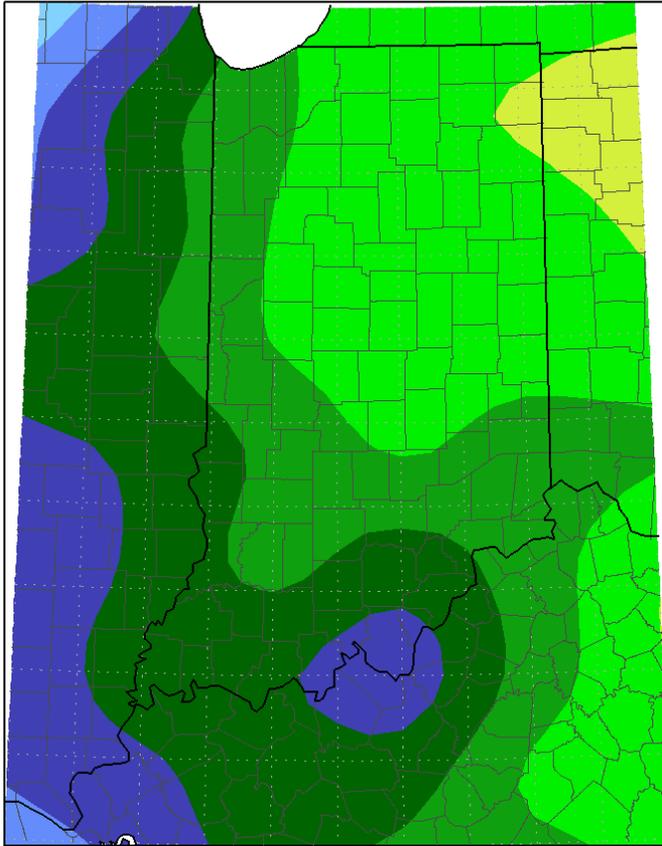
Analysis by Indiana State Climate Office
Web: <http://www.iclimate.org>

**Total Snowfall
November 2015
CoCoRaHS network
(366 stations)**



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

Accumulated Precipitation: Percent of Mean
November 1, 2015 to November 30, 2015

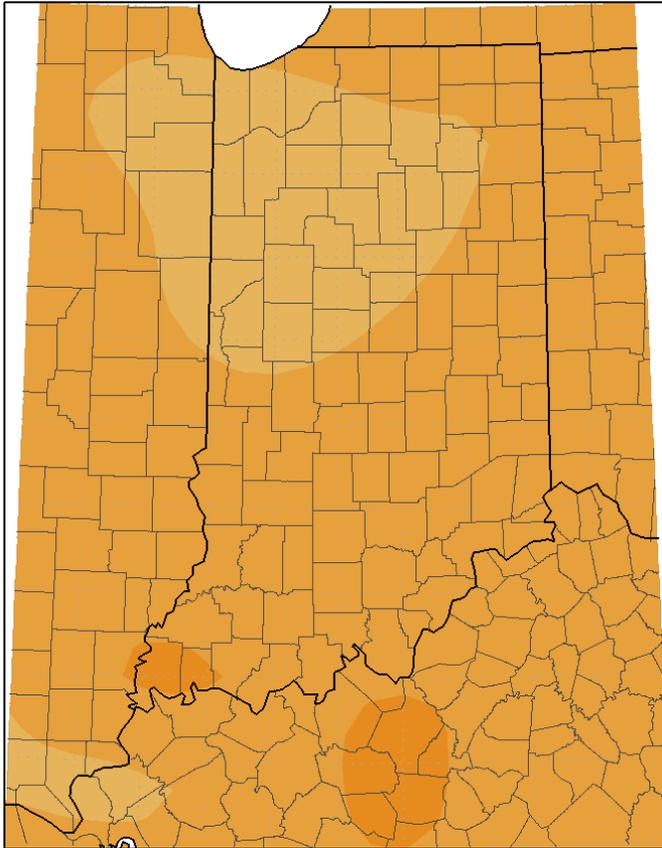


Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 12/7/2015 1:53:41 PM CST

Average Temperature (°F): Departure from Mean
November 1, 2015 to November 30, 2015



Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 12/7/2015 1:54:47 PM CST

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 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 what percentage of the state is drought free, and how much of the state is in drought by degree of severity (D1 - D4 category).

▼
Statistics type: Categorical Percent Area ▼
Indiana ▼

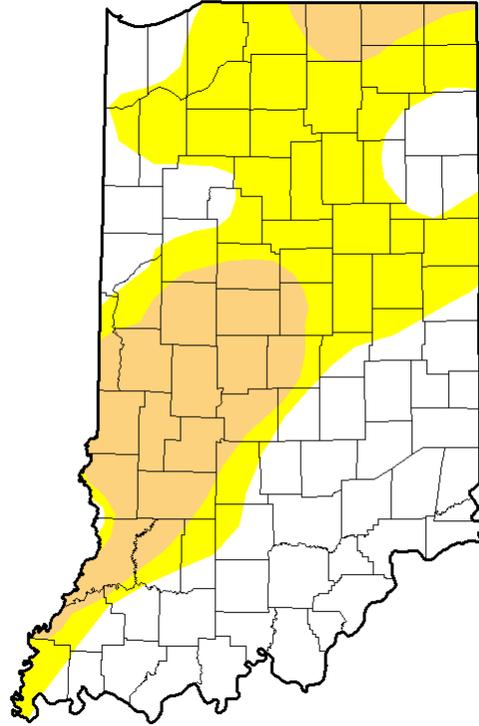
Percent Area in U.S. Drought Monitor Categories

Show 25 ▼ entries

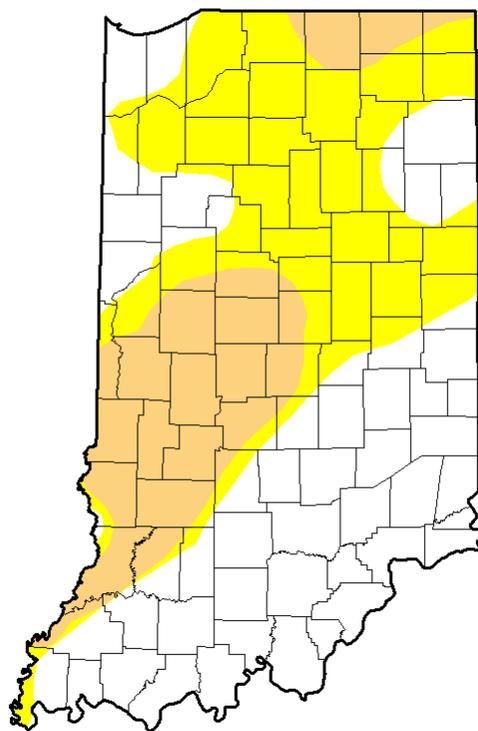
Search:

Week ▼	None ◆	D0 ◆	D1 ◆	D2 ◆	D3 ◆	D4 ◆
2015-12-01	46.84	35.09	18.07	0.00	0.00	0.00
2015-11-24	46.39	32.87	20.74	0.00	0.00	0.00
2015-11-17	46.06	33.20	20.74	0.00	0.00	0.00
2015-11-10	46.06	33.20	20.74	0.00	0.00	0.00
2015-11-03	43.39	35.87	20.74	0.00	0.00	0.00

November 3rd Drought Summary



November 10th Drought Summary



November 24th Drought Summary

