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Indiana State Climate Office

Monthly Weather Report

Dec 10, 2014



<http://www.inclimate.org>

November 2014 Climate Summary

Month Summary

Unseasonable cold headlined the Indiana and national news in November. The remnants of a typhoon in the far north Pacific were identified as the unusual cause. This was the 7th coldest November on record in Indiana since 1895. By mid-month it was said to be the coldest weather for so early in the season since 1959. Winter conditions including locally heavy snowfall, gusty cold winds, and traffic accidents due to icy roads arrived before people were ready for it.

The state average temperature was 35.8°F, a significant 6.6°F below the November normal. Some recent colder Novembers occurred in 1996 with a 35.7°F average temperature, the 6th coldest on the list. The coldest November on record was in 1976 with an average of 33.8°F. The day split in November 2014 had 22 days of below normal temperature, 8 days above normal, and no days at normal. There were 14 days when the daily state temperature was 10°F or more below normal and 2 days of at least 20°F below normal. On 3 days the daily state temperature was at least 10°F above normal. The highest temperature of the month in the cooperative network was 70°F which occurred on November 4th at Franklin wwtp and at Vincennes 5ne. On November 30th 70°F was observed again at Boonville 1s, the Evansville Regional Airport, and in Newburgh. The coldest temperature was 4°F on November 18th at West Lafayette 6nw.

November was drier than normal. The state precipitation average of 2.64" is 0.95" below normal. This ranks the month as the 48th driest November on record since 1895. Some recent drier Novembers include 2008 with a 2.11" state average, coming in at 31st driest. The next year 2009 had 1.46", ranking at 16th driest. November of drought year 2012 averaged 1.46", good for 4th place. The driest November on record was long ago in 1904, when the state average was only 0.36". The highest single day precipitation amount among cooperative stations in November 2014 was 2.51" recorded at Danville 3sw on November 24th. On that same day in the CoCoRaHS network the largest daily total was 3.76" at Indianapolis 9.5ne.

Regionally November 2014 precipitation was about 90% of normal in northern Indiana, 75% of normal in central areas, and 60% of normal in the south. Normal November precipitation ranges from 3.0" in northeast Indiana to 4.3" in southwest Indiana. Widespread precipitation fell on just 10 days this month.

The early arctic air this season swept over a still warm Lake Michigan. Lake effect snows were in full force, dumping up to 13" of snow this month in north central Indiana. Whiteouts, icy roads, and gusty winds triggered vehicle accidents, slide-offs, power outages, flipped and jackknifed semitrailers, and closed highways much earlier than usual this season.

November 1st – 8th

After a very cold start the middle of this first interim of November warmed up quickly. Then temperatures cooled slightly to end the 8 day interval. Snow which fell the Halloween overnight was recorded on November 1st. Light rain fell nearly every day afterward. There were no severe storms.

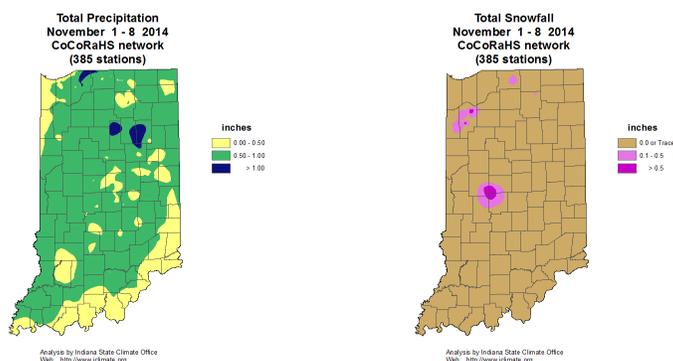
High pressure progressed eastward into Indiana as November began. The state average temperature was quite cold at 16°F below normal, rising a few degrees to 14°F below normal the next day. On November 3rd the ridge slid quickly to the Atlantic, shutting off cold air flowing from Canada and replacing it with warmer air pulled north from southern states. Indiana temperatures recovered abruptly to 2°F below normal by November 3rd, then to 4°F above normal on November 4th, the warmest of all 8 days.

The cold front of the first storm system of the month pushed through Indiana late on November 4th. The state average temperature initially held nearly steady. An Alberta clipper system roared cross country with its cold front rushing through Indiana on November 6th. The air behind this front was only moderately cold, dipping temperatures to 1°F below normal. A new ridge sprawled from Ontario to Texas on November 7th, again tapping into colder Canadian air at 4°F below normal. Finally a third cold front crossed Indiana on November 8th but temperatures held almost steady at 3°F below normal.

Over the 8 day interval the state temperature averaged 4°F below normal. Typically at the start of November daily maximum temperatures should range from 54°F to 62°F north to south across Indiana. Daily minimums typically vary between 37°F in far northern Indiana to 40°F in the far southwest corner of the state. The highest official temperature observed in the cooperative station network over the 8 days was 70°F at Vincennes 5ne on November 4th. The lowest official temperature in this network was an 18°F reading at Angola, Lagrange 1n, and Crawfordsville on November 3rd.

Snow which fell overnight into November 1st was measurable in the South Bend, Rensselaer, and Frankfort areas that morning. Some of these amounts included 1.1” at New Ross, 1.0” in Wheatfield and Rensselaer, 0.6” at Mount Ayr, and 0.5” in Demotte. No more snow fell in the remaining days so these are also the totals for the 8 day interval.

Precipitation includes rainfall and the water equivalent of melted snowfall. Rain and snow fell in Indiana on November 1st. Rain gages across Indiana on the morning of November 3rd were dry. Small amounts of rain fell on the remaining 6 days, including November 2nd, and the 4th through the 8th. Total precipitation over the 8 day interval averaged near 0.7” across northern Indiana, 0.6” in central counties, and 0.4” across the south. These amounts equate to about 90% of normal in the north, 70% of normal in central, and just 60% of normal across southern Indiana. Some of the heavier local precipitation totals for the 8 days include 1.57” in Andrews, 1.17” at Denver, 1.13” at Huntington, and 1.05” in Laporte.



November 9th – 15th

A major weather pattern change took place this week on November 11th, signaled by the passage of just one front across Indiana this week. The state average temperature spread was 25°F over the 7 days, from well above normal before arctic air arrived to unseasonably cold after. The type of precipitation followed the air temperature with rain the first half of the week and snow the latter half. Lake effect snows greatly impacted travel in far northern Indiana counties. Yet there was little moisture content in the precipitation which fell this week.

High pressure was departing Indiana on November 9th. The state average temperature began cold at 4°F below normal. An Alberta clipper storm system raced southeast to Nebraska the next day, positioning its warm front just north of Indiana. This front marked the boundary of a large sector of warm air north of the Gulf of Mexico including Indiana. The state temperature rose to 4°F above normal, then to 8°F above normal by November 11th. But early that morning arctic air had overtaken the Great Plains and was closing in on Indiana. The arctic cold front muscled through the state that afternoon. Very cold air poured into the state over the next few days. On November 12th the state average temperature had plummeted to 8°F below normal, then to 14°F below normal the next day.

Unseasonably cold air continued to fill Indiana on November 14th. The state temperature continued falling to 17°F below normal. The core of the cold air mass finally reached the state on November 15th. With high pressure overhead the temperature stabilized at 17°F below normal as the week ended.

The cold blast dominated the weekly state temperature, averaging to 7°F below normal. The normal daily maximum temperature this second week of November ranges from 50°F in far northern Indiana to 58°F in the far southwest corner of the state. Daily minimums typically vary from 35°F to 38°F north to south across the state. The highest local official temperature in the cooperative station network this week was 66°F at Evansville Airport on November 10th and at Tell City and Vincennes 5ne on November 11th. The lowest local temperature was 10°F at South Bend Airport on November 15th.

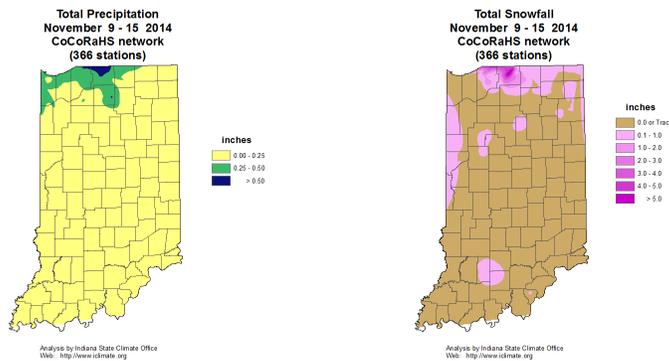
Rainfall this week before the cold arrived was very light statewide. The Alberta clipper with its cargo of arctic air carried little added moisture from western Canada into Indiana. The water content of combined rain and snow this week averaged just 0.2" in northern Indiana, and just 0.1" across central and southern areas of the state. These amounts equate to just 20% of normal in the north and 10% of normal in central and southern Indiana. The largest single day rainfall amounts were recorded the morning of November 12th. The CoCoRaHS observer in Bourbon measured 0.54" while in Portage 0.50" was caught. The Chesterton volunteer collected 0.46" and in Schererville 0.44" was noted. Highland had 0.40" that day.

Lake effect snow fell the last half of the week. Moisture picked up by arctic winds skimming the still warm waters the length of Lake Michigan was released on the cold lakeshore. The highest single day snowfall was reported by observers the morning of November 14th. The CoCoRaHS volunteer at Granger measured 4.6" while reporters from the South Bend vicinity noted 4.4", 4.0", and 3.0". At New Carlisle 4.0" was found in the gage. Some of the larger snow totals for the full week were near South Bend, including 5.8", 3.5", and 2.9". New Carlisle had 4.5" for the week while the Walkerton observer tallied 2.0".

Heavy snowfall rates on the afternoon of November 13th challenged drivers along and north of US 30 in northern Indiana. Traffic came to a standstill in places as drivers had to deal with their first significant snowfall of the season. By early afternoon 6.2" of snow had fallen in South Bend, a new daily record there. City police worked 143 crashes in a 90 minute interval in late afternoon. There were several slide-offs on local interstates and semi-trailers were jackknifed on ramps. Accidents were also reported near Fort Wayne including a fuel spill on I-69.

The cause of the arctic outbreak this week was rather unique. The remnants of Typhoon Nori moved into the Bering Sea and intensified into a powerful storm when running into much colder air. This clash unanchored a warm air block ahead of the storm and shoved it northward into the polar region. This dislodged arctic air over the North Pole and sent it surging southeast into Canada and eventually the northern US states. The jet stream path in the upper atmosphere was realigned. A pathway was opened to Siberia where frigid air could be drawn over the North Pole into Canada and then the Great Plains, finally spreading into states to the east.

The November 11th edition of the US Drought Monitor has removed all but one Indiana county from the abnormally dry D0 category. The eastern portion of Steuben county remains in abnormally dry status. The remaining 99.7% of total Indiana land area is now rated in normal soil moisture status for this time of year.



November 16th – 22nd

Unseasonable cold continued across Indiana all this week. Temperatures dipped to near zero in some places, the coldest weather for so early in the season since 1959. To date temperatures this month resemble the very cold patterns of 1976 and 1997. Snow was recorded every day this week except the last with the heavier amounts near Lake Michigan and the Ohio River.

The week began with the state average temperature at 14°F below normal. A cold front pushed through Indiana on November 17th, re-tapping into cold air pouring in from central Canada. The state temperature fell to 19°F below normal. High pressure spread to the state the next morning from Texas. Calm winds under clear skies allowed temperatures to nosedive to single digits. On November 18th the state average temperature plummeted to 26°F below normal. The daily maximum temperature that afternoon in central Indiana barely reached 20°F. This was certainly the coldest day of the week.

A new storm system approached Indiana on November 19th. A warm front briefly pulled in slightly warmer air and lifted the state temperature to 20°F below normal. A weak cold front moved through early the next day but stalled in Tennessee. Indiana temperatures barely noticed, rising slightly to 18°F below normal. On November 21st a ridge in North Dakota slid southeast over Indiana. A sunny day helped nudge temperatures a bit more to 15°F below normal. The ridge skirted east to Virginia on November 22nd. Much warmer air was now available and it was pumped northward into Indiana on the backside of the ridge. The state temperature bounced to just 3°F below normal to end the week.

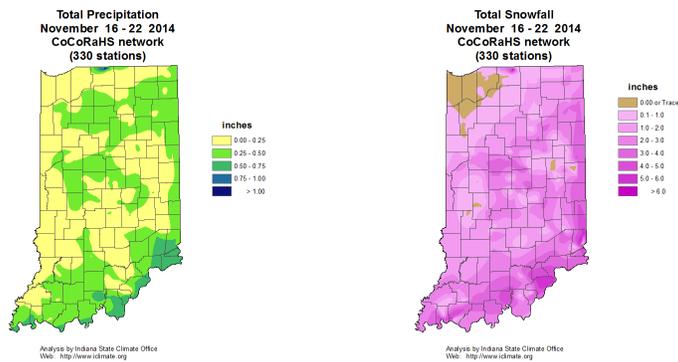
Over the 7 days the state temperature averaged to a bitter 16°F below normal. Typical daily maximum temperatures in mid-November should range between 46°F in far northern Indiana to 55°F in the far southwest. Daily minimums normally vary between 32°F and 35°F north to south across the state. The highest daily local maximum temperature among official cooperative network stations this week was 65°F at Boonville on November 22nd. The lowest daily minimum in this network during the week was 4°F at West Lafayette on November 18th.

It was so cold this week precipitation fell as snow on the first 6 of the 7 days. The heaviest snowfall was measured along the Ohio River the morning of November 17th. The CoCoRaHS observer in Charlestown recorded 6.0 inches, while the volunteer at Bright had 5.5". Two Newburgh observers noted 5.2" and 5.1". The next day the heaviest snow shifted across the state to the Lake Michigan effect region. A South Bend gage collected 5.3". No more snow fell in Charlestown and Newburgh so the one day amounts listed are also weekly totals. CoCoRaHS gages in McCordsville and Evansville each tallied 5.0" for the week.

It finally warmed just enough to rain on the last of the 7 days. Combining the water equivalent of all snow that fell along with rainfall yields precipitation. Galena summed the highest precipitation total at 0.65". Charlestown and Jeffersonville each had 0.61" while two Evansville volunteers had 0.58". Regionally about 0.25" of precipitation was collected in northern and central Indiana with 0.35" across the south. These totals are only about 50% of normal in northern and southern Indiana and 40% of normal in central counties.

Cold temperatures with gusty winds the morning of November 18th made travel difficult in the lake effect counties of Laporte, St Joseph, and Elkhart. Wind chills fell to below zero. Roads were iced over by blowing snow. Numerous spin-outs and slide-offs snarled traffic. Many accidents occurred in the South Bend vicinity where the US31 Bypass was closed for a while. School openings were delayed.

The November 18th edition of the US Drought Monitor made no changes to the state soil moisture status since the previous week. A small portion of Steuben county continues in abnormally dry status, also known as the D0 category. This sub-county region equates to less than 1% of the total state area.



November 23rd – 30th

The weather was mild on the weekends but the week days very cold this final interval of November. The state average temperature swung 25°F over the 8 days, more often extreme than near normal. Locally heavy rain was recorded on November 24th while lake effect snow accumulated 4 days

later. Power outages and glazed roads caused by wind gusts were the main hazards late in the month.

Warm air surged into Indiana on November 23rd on the backside of strong high pressure positioned off the Virginia coast. The state temperature on that day was 10°F above normal. An intense storm system pulled a cold front through Indiana on November 24th, causing gusty winds, heavy rain, and power losses. A second cold front passed through the state the next day which transported in much colder air. The state temperature plunged to 7°F below normal, then to 11°F below normal by November 26th. Thanksgiving Day was the coldest of the 8 days, bottoming out at 12°F below normal.

Unlike earlier in the month this cold spell would not last. Another cold front rushed through Indiana on November 28th followed the same day by a ridge overhead. The ridge raced to the Atlantic coast the next day, pumping much warmer air back into the Midwest. The state temperature climbed 15°F in a single day, boosting the state temperature to 6°F above normal. The Atlantic ridge continued to draw warm air into Indiana on November 30th, closing the month at 13°F above normal.

During the 8 day interval temperatures had bounced high and low, averaging right at normal. Normal daily maximum temperatures these final days of November run from 43°F in far northern Indiana to 51°F in the extreme southwest. Typical daily minimums range between 29°F and 33°F north to south across the state. The highest official daily cooperative station temperature over this time was 70°F at Boonville 1 S, Evansville Regional Airport, and Newburgh on November 30th. The lowest daily cooperative network temperature was 9° at Goshen Airport on November 28th.

Rainfall was observed in Indiana on November 23rd – 26th, and on November 30th. Of these events locally heavy rain was recorded on November 24th, the wettest of the 8 days accounting for much of the total rainfall. In the CoCoRaHS network an observer about 10 miles northeast of Indianapolis measured 3.76” that morning. The Bloomington volunteer had 2.69” and Westfield 2.64”. The rain gauge had 2.62” in it at Francisco while in Carmel 2.50” was collected.

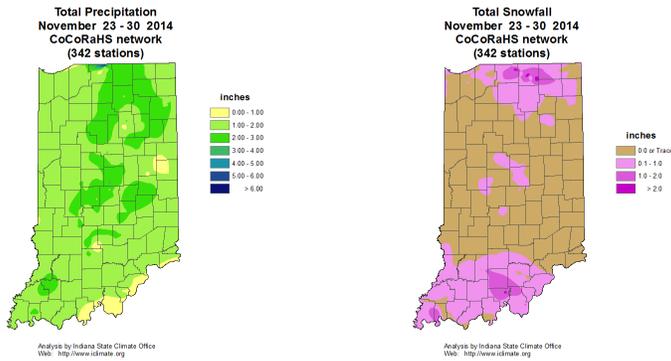
It was too cold to rain much after this date but snowfall added little water content later on. Regionally precipitation averaged about 1.7 inch across northern and central Indiana, and 1.5 inch in the south. These amounts equate to about 180% of normal in the north, 160% of normal in the central section, and 110% of normal in southern Indiana. The heaviest CoCoRaHS network precipitation over the 8 days was 3.98 inches near Indianapolis, 3.20 inches at Carmel, 2.89 inches in Westfield, 2.85 inches at Petersburg, and 2.73 inches in Logansport.

Snowfall was recorded the mornings of November 25th, and November 27th – 29th. A lake effect event observed the morning of November 28th was significant, with 3.0 inches collected near Goshen, 2.5 inches at Millersburg, and 2.4 inches at Mishawaka. Snow showers and dustings occurred on the remaining days. Snow amounts noted on November 28th were quite close to the 8 day totals with the heaviest in Elkhart county.

Windy conditions during the warm air surge on November 23rd pushed a tree on to a Lawrence county highway. Gusty winds to almost 70 mph carried the arctic chill into Indiana on November 24th. Trees were ripped down in Elkhart, Jennings, and Wayne counties. The gusts caused headaches for drivers. A semitrailer blew over on I-65 in Lake county. Brief whiteouts caused

visibility problems for many travelers. While a few customers lost power in Lake, Porter, and Laporte counties up to 13,000 lost electric service throughout the state that day. The Fort Wayne area was especially hard hit. Roadway slide-offs were common the next day especially in east central Indiana. On Thanksgiving Day slick conditions on I-65 in Tippecanoe county triggered more accidents.

The US Drought Monitor edition of November 25th finally removed the last traces of abnormally dry soils in Indiana. This is the first week since June 17th that all Indiana soils are rated in normal soil moisture status. All D0 category ratings in the state have now been removed.



November 2014

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	33.7	40.5	-6.9
North Central	33.8	40.4	-6.5
Northeast	34.1	40.1	-6.0
West Central	34.9	42.1	-7.2
Central	35.7	41.9	-6.3
East Central	35.6	41.3	-5.7
Southwest	38.2	45.4	-7.2
South Central	38.4	45.0	-6.6
Southeast	37.7	44.3	-6.5
State	35.8	42.4	-6.6

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	2.60	3.16	-0.55	83
North Central	3.03	3.16	-0.13	96
Northeast	2.78	3.02	-0.24	92
West Central	2.49	3.60	-1.11	69
Central	2.87	3.63	-0.77	79
East Central	2.62	3.36	-0.74	78
Southwest	2.52	4.27	-1.75	59
South Central	2.52	4.09	-1.57	62
Southeast	2.10	3.70	-1.60	57
State	2.64	3.59	-0.95	74

Autumn (September - November)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	49.3	52.7	-3.4
North Central	49.2	52.2	-3.0
Northeast	49.1	51.8	-2.7
West Central	50.7	54.0	-3.3
Central	51.2	53.6	-2.4
East Central	50.6	52.8	-2.2
Southwest	54.1	56.8	-2.7
South Central	53.7	56.2	-2.4
Southeast	53.1	55.4	-2.4
State	51.3	54.0	-2.7

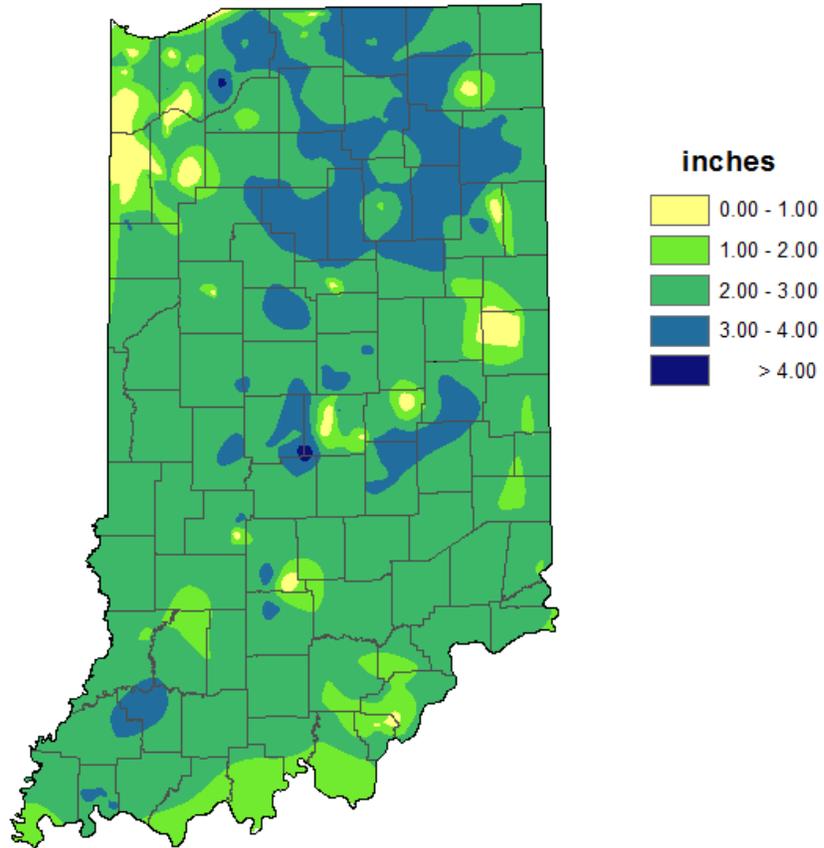
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	11.00	9.29	1.71	118
North Central	10.48	9.41	1.07	111
Northeast	9.97	8.92	1.06	112
West Central	11.01	9.53	1.48	116
Central	10.00	9.44	0.56	106
East Central	7.98	8.88	-0.90	90
Southwest	10.77	10.45	0.32	103
South Central	11.05	10.21	0.84	108
Southeast	8.99	9.66	-0.67	93
State	10.28	9.58	0.70	107

2014 Annual so far

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	48.5	52.2	-3.8
North Central	48.3	51.8	-3.5
Northeast	48.0	51.4	-3.4
West Central	50.7	53.8	-3.1
Central	51.0	53.4	-2.4
East Central	50.3	52.6	-2.2
Southwest	54.6	57.0	-2.4
South Central	54.3	56.4	-2.1
Southeast	53.4	55.5	-2.1
State	51.1	53.9	-2.8

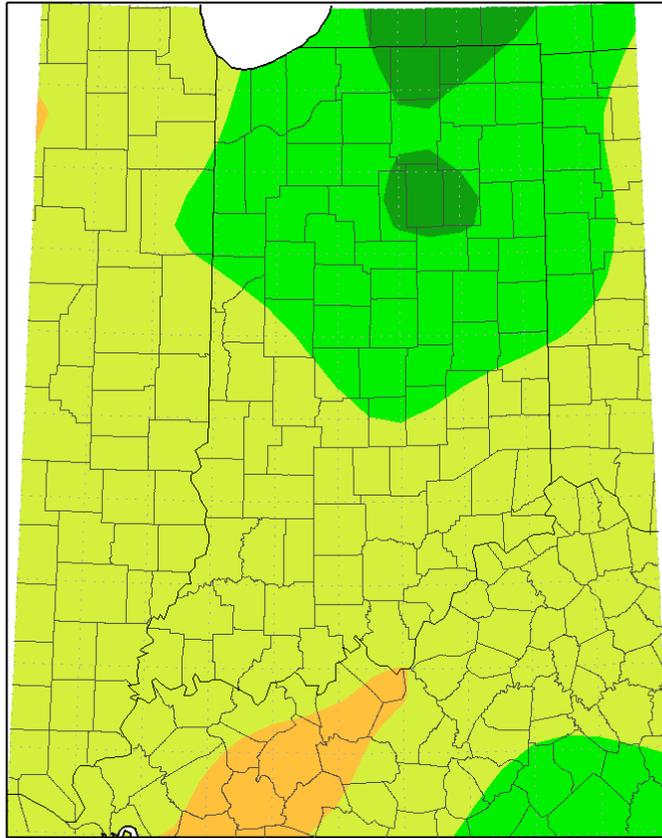
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	42.83	35.36	7.47	121
North Central	38.19	35.40	2.79	108
Northeast	35.05	34.06	0.99	103
West Central	40.15	38.27	1.89	105
Central	40.59	37.75	2.84	108
East Central	38.31	36.36	1.95	105
Southwest	44.55	42.02	2.53	106
South Central	47.07	42.14	4.93	112
Southeast	40.75	40.71	0.04	100
State	41.10	38.12	2.98	108

**Total Precipitation
November 2014
CoCoRaHS network
(379 stations)**

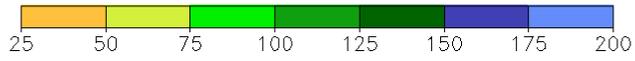


Analysis by Indiana State Climate Office
Web: <http://www.iclimat.org>

Accumulated Precipitation: Percent of Mean
November 1, 2014 to November 30, 2014

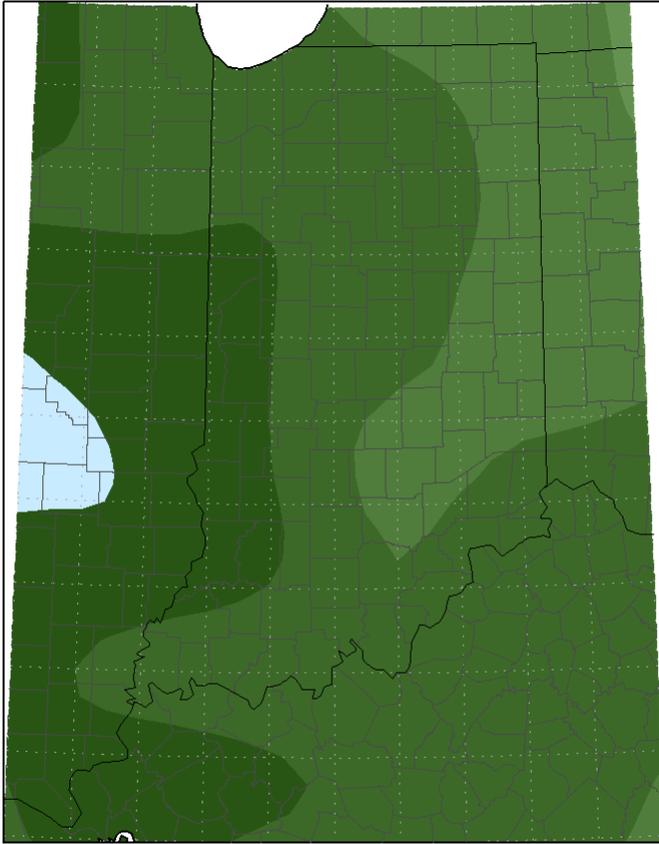


Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 12/10/2014 1:02:48 PM CST

Average Temperature (°F): Departure from Mean
November 1, 2014 to November 30, 2014



Mean period is 1981–2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 12/10/2014 1:03:33 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).

Indiana

Drought Severity

	D0 - Abnormally Dry		D2 Drought - Severe		D4 Drought - Exceptional
	D1 Drought - Moderate		D3 Drought - Extreme		

Popu

Statistics type: Traditional (D0-D4, D1-D4, etc.) Categorical (D0, D1, etc.)

Percent Area in U.S. Drought Monitor Categories

Week	None	D0	D1	D2	D3	D4
2014-12-02	100.00	0.00	0.00	0.00	0.00	0.00
2014-11-25	100.00	0.00	0.00	0.00	0.00	0.00
2014-11-18	99.74	0.26	0.00	0.00	0.00	0.00
2014-11-11	99.74	0.26	0.00	0.00	0.00	0.00
2014-11-04	97.18	2.82	0.00	0.00	0.00	0.00

November 4th Drought Summary



November 11th Drought Summary



November 18th Drought Summary



November 25th Drought Summary



