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Indiana State Climate Office

Monthly Weather Report

Jun 5, 2014



<http://www.inclimate.org>

May 2014 Climate Summary

Month Summary

May was slightly warmer than normal with near normal precipitation. This should not infer that May was a quiet weather month! Severe weather on five days this month racked up property damage with estimates on May 9th alone exceeding \$100 million. The natural destructive forces at work included wind gusts, hail, heavy rainfall, and lightning fires, but...not tornadoes.

The May state average temperature of 63.6°F was 1.6°F above normal. This ties 1921, 1985, and 1999 as the 33rd warmest May on record in Indiana since 1895. Some recent warmer Mays include the 64.3°F average of 2010, ranking as 25th warmest May. Two years later the 2012 number was 67.7°F, good for 5th place. Last year the May average was 64.4°F, coming in at 23rd place. The warmest May on record was the 68.5°F statistic in 1896. The day split in May 2014 had 10 days of below normal temperature, 21 days above normal, and no days at normal. The state average temperature was 10°F or more below normal on 4 days and 10°F or more above normal on 5 days. The highest cooperative network temperature of the month was 92°F, recorded at West Lafayette on May 9th. The coldest temperature was 30°F on May 16th in Lagrange.

May state precipitation averaged 4.18 inches, or 0.22 inch below normal. This places May 2014 as the 64th driest on record since 1895. Last year was drier with 3.71 inches, plugged into 52nd place. One year earlier the 2.75 inches in May 2012 ranked in the 22nd spot. In 2005 the May average was 2.57 inches, pegged at 18th place. Then there was the 1.75 inch average in 2007, coming in 8th place. The driest May on record had a meager 1.13 inch average in 1934 during the dust bowl.

Regionally May 2014 precipitation was about 105% of normal in northern Indiana, 90% of normal in the central third, and 95% of normal in the south. Normal May precipitation ranges between 3.5 inches in west central Indiana to 5.4 inches in the south central area. The highest single day precipitation report in the cooperative network this month was 3.43 inches on May 15th. In the CoCoRaHS network the highest daily value was 4.00 inches that same day, in the same community, at Tell City. Widespread precipitation fell on about 18 days this month.

A macroburst on May 9th devastated a 35 mile stretch of Vanderburgh and Warrick counties, destroying about 100 buildings. Wind and hail damage, flooding, and lightning fires were widespread in Indiana on May 11th. Hail fell in 16 counties on May 21st while lightning strikes started more fires. May 15th was one of the coldest May days on record with daytime maximum temperatures barely exceeding 50°F.

May 1st – 10th

The opening 10 days of May saw a general warming trend until the last few days of the interval. Rainfall was nearly absent until mostly light amounts fell during the late cool down. The cooler days near the end brought severe weather to far southwest Indiana in the form of a macroburst with estimates of nearly \$100 million dollars in damage.

Cool air trickled south to Indiana behind an occluded low pressure center in Wisconsin, holding the state average temperature at 7°F below normal on May 1st. Rainfall was very light in the southern half of Indiana and in the northwest. Two days later a very weak cold front moved through the state but with no cold air push behind it state temperatures actually rose to 1°F above normal with clearing skies. The cold front stalled along the Ohio River on May 4th. But this was a dry front, skies remained mostly clear, and temperatures nudged upward to 3°F above normal. The weather pattern stagnated over Indiana the next two days. The state temperature changed little hanging close to 1°F to 2°F above normal through May 6th.

The stationary front perched along the Ohio River finally moved north through Indiana to the Michigan border over the next two days. The state temperature now responded, climbing to 9°F above normal by May 7th, then to 14°F above normal on May 8th, the warmest day of the 10 day interval. Indiana was now positioned squarely inside a warm air sector with its parent low pressure still far to the west over Iowa.

This low center surged north to Wisconsin on May 9th, drawing in much colder air behind it along the Mississippi River. This set the stage for severe weather over southwest Indiana that day. The cold front finally reached Indiana on May 10th but lost its momentum. This front halted over central Indiana and became a new stationary front there as the 10 day interval closed. The state temperature did fall these last two days, to 10°F above normal on May 9th, then to 5°F above normal on May 10th. Overall it was a warm 10 days and the state temperature averaged to 3°F above normal. Typically at the start of May daily maximum temperatures should range between 67°F in far northern counties to 74°F in far southwest Indiana. Daily minimums normally vary from 45°F to 51°F north to south across the state.

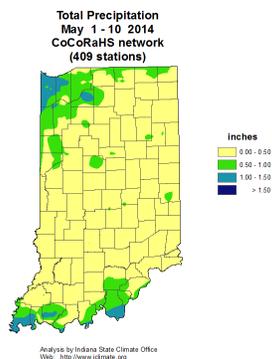
When stationary fronts hover near Indiana a wet spell might be expected. But storms over these 10 days carried little moisture and only the last cold front produced significant rainfall. For the full 10 days regional precipitation averaged about 0.5 inch in the northern third of Indiana, 0.3 inch in the central section, and 0.6 inch across the south. These totals were far below normal, and equate to about 50% of normal in northern Indiana, 20% of normal in central counties, and 40% of normal in southern areas. There were spots of locally heavy rain in extreme northwest and southwest Indiana as recorded on May 9th and 10th. In southwest Indiana the CoCoRaHS observer at Boonville measured 1.60 inch, while at Chandler 1.51 inch was noted. Evansville had 1.28 inch. In northwest Indiana the St John volunteer had 1.29 inch. The Merrillville observer collected 1.05 inch while 1.01 inch was recorded at Hobart. Over the entire 10 days 1.81 inch was summed at DeMotte, Hobart tallied 1.61 inch and Knox 1.60 inch. Boonville rainfall summed to 1.62 inch while Chandler had 1.53 inch.

A macroburst impacted large portions of Vanderburgh and Warrick counties on May 9th. A macroburst is a cool blast of air from inside a thunderstorm, after diving to a collision with the ground, spreads rapidly outward along the earth over a large area. The peak wind in this macroburst was reported at 120 mph with a damage trail 35 miles long. There were no reports of deaths or injuries. The damage path stretched from the west side of Evansville through Newburgh to 2 miles southeast of Gentryville. A determination will be made if this storm event included a tornado.

About 50,000 buildings were left without power. An estimated 100 structures were damaged with many destroyed. In Evansville 3 homes were destroyed including one split in half by a falling tree. Some 20 other buildings were damaged. The city of Boonville was harder hit than Evansville and declared a state of emergency. The 4H area and the county jail sustained damage. The Red Cross had set up in both Evansville and Boonville. The roof of a Boonville high school was ripped off with 125 students still inside. Nine classrooms were damaged as were athletic fields. The school suffered heavy water damage and much of the city had no power. Several trees fell on cars. Thousands of trees were uprooted, snapped, or damaged. Hundreds of power poles were either snapped or blown over. One hard hit farm suffered damage estimated at \$2 million. The total damage in this event could exceed \$100 million, yet not enough to qualify for federal disaster assistance.

The Evansville airport measured an 89 mph gust during the macroburst. Peak wind speeds were estimated to 70 mph near Boonville. In Vanderburgh county part of a roof was torn off a metal building and trees and power lines were torn down. One tree fell on a car and trapped the driver inside. Dozens more vehicles were damaged by falling trees. Another tree fell on a house. Winds to 63 mph were reported in Perry county to the east. Unrelated to the macroburst across the state, 60 mph winds were reported in Allen county. Hail one inch in diameter was reported in Cass county.

In a separate severe event, new storms hammered the Louisville metro area on May 10th. A thunderstorm producing lots of smaller hail hit towns near the Floyd/Clark county line the hardest. Hail stones with 1.00 to 1.25 inch diameters were reported with wind gusts to 50 mph. One inch hail was also reported in Gibson county.



May 11th – 17th

A warm start to the week was interrupted by unseasonably cool daytime temperatures. A deep intense trough of low pressure in the upper atmosphere was in control of the chilly weather. Rain fell every day this week with locally heavy amounts. There were two severe weather days, one generating a mix of tornado, hail, and wind gust events with the latter only reports of wind damage.

A warm front passed through Indiana on May 11th. Late in the day thunderstorms rolled through far northwest Indiana causing significant wind damage and an observed but unconfirmed tornado. Large hail were noted in central and southern parts of the state. The week opened with state temperatures at 7°F above normal, warming to 11°F above normal by May 13th. A sector of warm air had taken firm control of the region.

A strong cold front punched through Indiana on May 14th. Temperatures dove 15°F to 5°F below normal. The cold front slowed in Ohio as it waited on a southern storm system to ride along the front northward. This hesitation gave cold Canadian air more time to seep into Indiana and push temperatures still colder to 11°F below normal on May 15th. Daytime maximum temperatures barely reached 50°F statewide, unseasonably chilly for a day in May.

The Ohio cold front finally moved on to east coast states the next day, but a reinforcement of cold Canadian air was already on the move southward into Iowa and Missouri. A new cold front at the leading edge of the cold air mass crossed Indiana on May 16th. State temperatures fell again to 15°F below normal. High pressure driving the cold air reinforcement surged east to the Atlantic Ocean on May 17th, sprawling across the eastern half of the country and holding Indiana temperatures down at 14°F below normal to close the week. The subnormal cold dominated this week and it shows in the weekly average state temperature statistic at 3°F below normal. Usually at this time in May daily maximum temperatures should range from 69°F in northern Indiana to 76°F in far southwestern counties. Normal daily minimums typically vary between 48°F and 54°F north to south across the state.

The intense low pressure trough in the upper atmosphere supported not only cold temperatures at ground level but every day rainfall in Indiana. Reports of heavy precipitation were especially noteworthy on the mornings of May 12th and 15th when several locations exceeded 2 inches. Extreme amounts on May 12th topped out at 3.15 inches at Claypool with 2.75 inches in Anderson. The heaviest CoCoRaHS reports on May 15th came from volunteers in Tell City with 4.00 inches, in Leo with 2.66 inches, and a report of 2.65 inches in Shoals. Over the entire week the Shoals observer caught 5.48 inches while Whitestown measured 5.45 inches. Other large totals included 5.43 inches at Mount Ayr, 5.24 inches in Atlanta, and 5.16 inches summed in Celestine. Regionally for the week about 2.8 inches fell in northern Indiana, 2.9 inches in central sections, and 3.1 inches in the south. These amounts equate to about 340% of normal in the northern third of Indiana, 290% in central areas, and 250% of normal across the south.

Severe weather on May 11th caused significant wind damage in far northwest Indiana and hail damage in central and southern parts of the state. In Jasper county an observed but unconfirmed tornado was reported near Rensselaer. High winds pulled trees on to power lines in Lake, Porter, and Laporte counties, causing widespread power outages. In Lake county a tree fell on a house and several trees were uprooted. A tree fell on a vehicle in Lake Station and on an interstate ramp.

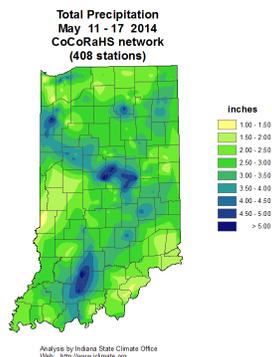
Peak winds of 78 mph were recorded at Gary Airport. Broken power poles, downed power lines, and ripped trees were numerous in Gary and Hobart.

In Porter county a transformer blew. In Portage homes were damaged and a restaurant roof was blown off. Some of the hail in Portage was so intense it riddled home siding as if hit by machine gun fire. Falling trees in Laporte took out a garage and two vehicles inside, shattering all the car windows. More than 25,000 customers were without power in northwest Indiana at the peak of the storm.

Street flooding was another hazard created by the May 11th storms. There were slide offs and crashes during the heavy rainfall. A family had to be rescued from a flooded vehicle in Lake county when heavy rains flooded roads there. Street flooding was also serious in Hammond. Hobart had at least 20 reports of trees down and streets flooded.

Meanwhile in central Indiana hail 1.00 to 1.25 inch in diameter fell in Boone, Marion, Delaware, Randolph, Rush, Fayette, Knox, Crawford, and Perry counties. High winds snapped a pole in Fountain county bringing power lines down there. Roof shingles were ripped off in Marion county and siding off a house in Fayette county. A home in Marion county was likely struck by lightning as it was badly burned causing \$65,000 in damage. Another house fire in Battle Ground, in Tippecanoe county, was also thought to have been started by lightning. In rural areas there was concern when old field corn stalks were being carried away into waterways, headed to lift stations where they could become get caught in water treatment equipment.

Storms on May 13th primarily caused scattered wind damage. In Johnson county winds peaked at 50 mph, tearing down trees, power lines, and damaging buildings. At an Edinburgh high school the grandstand was bent in two and dragged onto a football field. In neighboring Shelby county 60 mph winds bent poles while large trees fell. Trees fell in Fayette county while trees took down power lines in Union county. Trees fell and blocked a road in Noble county while roads had to be closed in Hamilton county when power lines fell on them. Finally in Dubois county a pole barn was blown down by wind gusts.



May 18th – 24th

A broad high pressure ridge in the upper atmosphere dominated Midwest weather much of this week and blocked most storms from moving in. Only one low pressure system trekked through Indiana this week. The day to day movement in the thermometer as this single system crossed the state was obvious. The extreme air mass change was enough to trigger severe weather on two days. Yet weekly rainfall totals were generally below normal.

The week began very cool at 12°F below normal. High pressure with mostly sunny skies was overhead the state through May 19th. The warm front ahead of the storm system crossed Indiana on May 20th, firing thunderstorms that produced hail and wind in the far northern counties. State temperatures ramped up quickly in response to the warm surge, rising 13°F in two days to 1°F above normal.

The cold front of this system was close by on May 21st. Wind and hail damage was widespread across central and southern Indiana in the warm air ahead of the cold front. The state average temperature peaked on May 21st at 8°F above normal.

The cold front advanced through the state the next day. Temperatures began to fall to 3°F above normal. Cooler air continued to flow into the state on May 23rd and temperatures fell again to 2°F below normal. A high pressure center behind the cold front moved overhead Indiana on May 24th, marking a return to drier weather with the state temperature holding at 2°F below normal. Overall for the week the state temperature averaged 2°F below normal. Typically for mid-May daily maximum temperatures are expected to range from 72°F to 78°F north to south across the state. Daily minimums normally vary between 50°F in the far north to 56°F in far southwest Indiana.

The warm and cold front which passed through Indiana in mid-week produced most of the rainfall. Regionally about 0.4 inch fell in northern Indiana, 0.5 inch in central, with 0.7 inch across the south. These totals were just 40% of normal in the northern third of the state, 50% in central counties, and 80% of normal in the south. Yet locally heavy showers were noted by CoCoraHS volunteers on May 22nd. The Lebanon gage captured 2.54 inches while 2.53 inches fell at Pekin. Two Indianapolis reports came in with 2.52 and 2.32 inches. Some of the highest weekly totals were found in the Indianapolis vicinity, including three spots with 2.52, 2.20, and 2.17 inches. The New Palestine gage collected 2.46 inches for the week while Taylorsville tallied 2.12 inches.

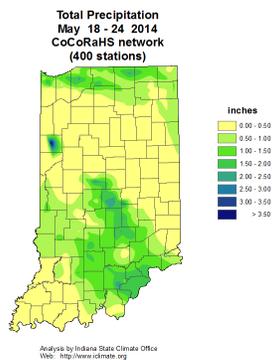
The first signs of severe weather popped up in far northern Indiana on May 20th. Large hail 1.75 inch in diameter struck the extreme northwest corner of the state in Lake county while 1.25 inch hail was reported in the northeast corner in Steuben county. Wind gusts downed a few trees in Laporte county while a tree fell on a house in Marshall county.

Severe weather moved on to central and southern Indiana the next day, covered a much larger area, and caused heavier damage. Large hail occurred in 16 counties: Clinton, Fountain, Parke, Montgomery, Boone, Hendricks, Marion, Morgan, Shelby, Decatur, Monroe, Jefferson, Clark, Floyd, Crawford, and Pike. Of these incidents extremely large hail 2.75 inches in diameter was measured in Montgomery county. Still quite large were stones of 1.75 inch diameter noted in Fountain, Parke, Boone, Marion, and Crawford counties. Hendricks county hail was 1.5 inch in diameter. Elsewhere hail sizes to 1.25 inch in diameter were most common.

Areas of 60 mph wind gusts were mixed in with the hail. A utility pole in Boone county was ripped down when trees fell on power lines. Trees fell on homes in Washington county and blocked roads in Johnson, Switzerland, and Harrison counties. Fallen trees caused no significant damage in 8 other counties: Vermillion, Vigo, Morgan, Shelby, Bartholomew, Jennings, Scott, and Lawrence. In Ripley county falling trees damaged a barn roof and moved a farm shed.

Thunderstorms packed not only hail and wind gusts but also dangerous lightning. Lightning strikes started at least 3 fires in Indianapolis, including to a home, a veterinary clinic, and caused \$250,000 in damage to an apartment complex. Lightning fires were also reported in the nearby counties of Johnson and Hamilton. More than 6,300 people lost power in Indianapolis during the storms.

In Lake county two sheds were destroyed by fire caused by a lightning strike. More homes were hit by lightning in these areas but not severely damaged. Meanwhile heavy rains flooded roads which contributed to multiple crashes on I-94.



May 25th – 31st

Indiana temperatures were warm all week long. While it rained almost daily, weekly totals were mostly low. The polar jet stream was largely in charge of the weather, positioned along the Canadian border much of the week. Yet a large closed low pressure center in the upper atmosphere, meandering alone across the southern states, kicked streaks of moisture north across Indiana as shower activity in mid-week.

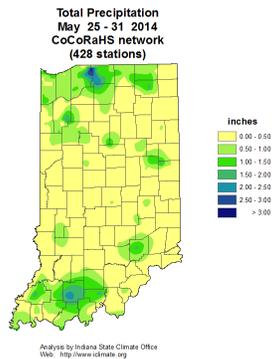
At ground level high pressure was overhead Indiana to start the week, gradually shifting east of the state on May 26th and 27th. State temperatures warmed in southerly winds behind the high center, rising from 3°F above normal on May 25th to 10°F above normal by May 27th. This was the warmest day of the week.

The upper low center now came into play for the next 3 days, spinning moisture northward from the Gulf states. A cold front on May 28th stalled over far northern Indiana, its cloudy skies dropping the state temperature a bit to 9°F above normal. The next day the stationary front drifted to southern Indiana, lowering temperatures a little more to 7°F above normal. High pressure in Michigan

nudged this stationary front to the Ohio River on May 30th, allowing state temperatures to continue their slow slide to 5°F above normal. By May 31st the stationary front had disappeared. A ridge of high pressure stretched from eastern Canada through West Virginia, having broken south through two stationary fronts. The state temperature held steady at 5°F above normal to wrap up the week and month. The state temperature overall for the week had averaged to 7°F above normal. Typically this last week of May the daily maximum temperature should range from 74°F in far northern Indiana to 80°F in the southwest corner of the state. Daily minimums should vary between 53°F and 58°F north to south.

The only significant rainfall of the week occurred when the closed low system in the upper atmosphere was close enough to impact Indiana weather from May 27th to 29th. Regional weekly precipitation averaged near 0.4 inch in northern and southern Indiana, with just 0.2 inch in the central third of the state. These totals equate to about 40% of normal in northern and southern areas and 20% of normal across central Indiana. Heavy local thunderstorms can occur in Indiana this time of year. This week the heaviest single day precipitation amounts were reported the morning of May 27th in St Joseph county. Two CoCoRaHS volunteers near New Carlisle measured 2.95 inches and 1.90 inch that day. Two Walkerton observers noted 2.43 inches and 2.24 inches that same morning. Overall for the full week the two Walkerton gages had collected 2.55 inches and 2.27 inches. In southwest Indiana two Huntingburg gages had summed to 2.42 inches and 2.41 inches. The Princeton total was 2.07 inches for the week.

There was just one damage report due to severe weather this week. Late on May 26th high winds in Fulton county uprooted some large trees. Wind gusts continued in northern Indiana the next day but no reports of damage were received.



May 2014

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	61.6	60.8	0.8
North Central	61.2	60.3	1.0
Northeast	60.9	59.8	1.0
West Central	63.6	62.3	1.3
Central	63.4	61.7	1.7
East Central	63.1	60.8	2.3
Southwest	66.4	64.6	1.9
South Central	66.1	63.9	2.2
Southeast	65.1	63.0	2.1
State	63.6	62.0	1.6

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	4.26	3.98	0.28	107
North Central	3.93	3.85	0.08	102
Northeast	3.79	3.78	0.02	100
West Central	3.48	4.38	-0.89	80
Central	4.20	4.40	-0.20	95
East Central	3.89	4.31	-0.42	90
Southwest	4.41	4.99	-0.58	88
South Central	5.34	5.00	0.34	107
Southeast	4.14	4.85	-0.71	85
State	4.18	4.40	-0.22	95

Spring (March - May)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	46.9	49.6	-2.7
North Central	46.4	49.0	-2.6
Northeast	45.8	48.5	-2.7
West Central	50.2	51.5	-1.3
Central	50.2	50.9	-0.7
East Central	49.5	49.9	-0.4
Southwest	53.9	54.7	-0.8
South Central	53.7	54.1	-0.4
Southeast	52.7	53.1	-0.4
State	50.0	51.4	-1.3

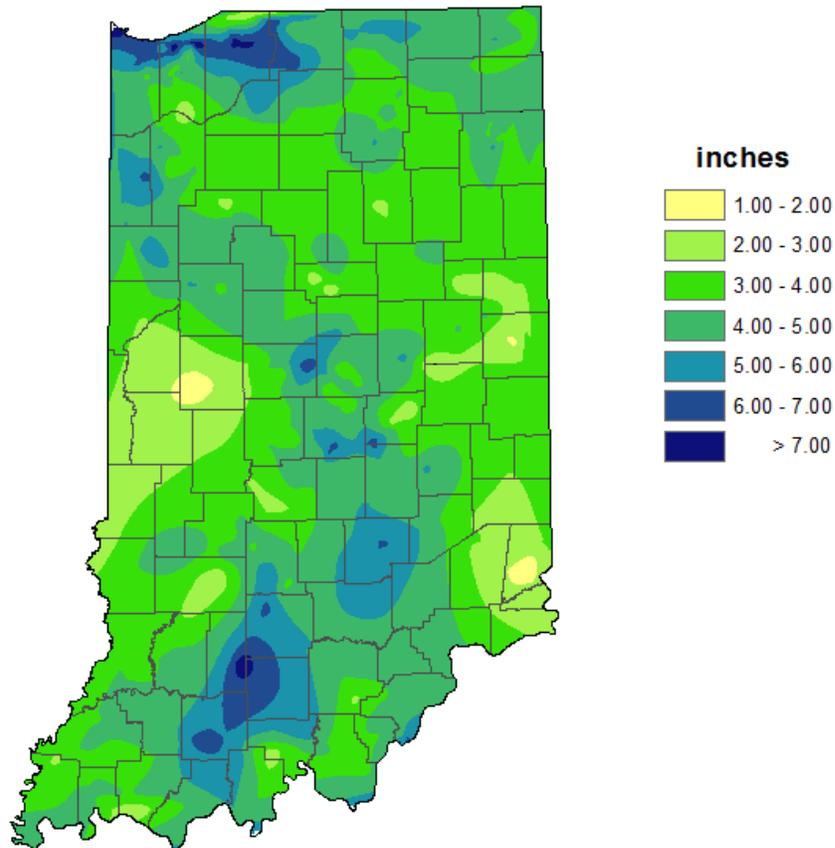
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	8.82	10.50	-1.68	84
North Central	8.81	10.22	-1.42	86
Northeast	8.96	9.96	-1.00	90
West Central	10.37	11.61	-1.24	89
Central	12.20	11.59	0.61	105
East Central	12.00	11.16	0.84	107
Southwest	15.73	13.66	2.06	115
South Central	16.90	13.59	3.31	124
Southeast	13.83	13.01	0.82	106
State	12.03	11.74	0.29	102

2014 Annual so far

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	34.7	40.1	-5.4
North Central	34.5	39.7	-5.2
Northeast	34.1	39.3	-5.2
West Central	38.1	42.1	-4.0
Central	38.5	41.7	-3.2
East Central	37.7	40.8	-3.1
Southwest	43.0	45.9	-3.0
South Central	42.8	45.5	-2.7
Southeast	41.6	44.5	-2.9
State	38.4	42.3	-3.8

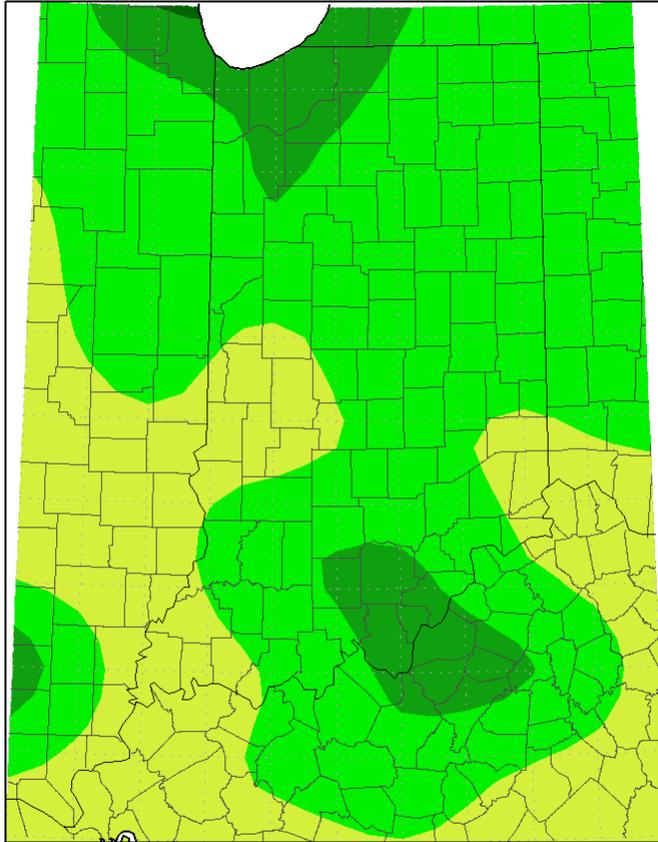
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	13.87	14.05	-0.19	99
North Central	14.31	14.07	0.24	102
Northeast	14.52	13.72	0.80	106
West Central	15.51	16.06	-0.54	97
Central	17.30	16.20	1.10	107
East Central	16.72	15.60	1.12	107
Southwest	20.11	19.54	0.57	103
South Central	22.00	19.61	2.39	112
Southeast	18.59	18.82	-0.23	99
State	17.07	16.46	0.61	104

**Total Precipitation
May 2014
CoCoRaHS network
(427 stations)**

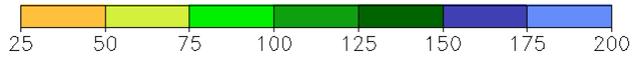


Analysis by Indiana State Climate Office
Web: <http://www.iclimate.org>

Accumulated Precipitation: Percent of Mean
May 1, 2014 to May 31, 2014

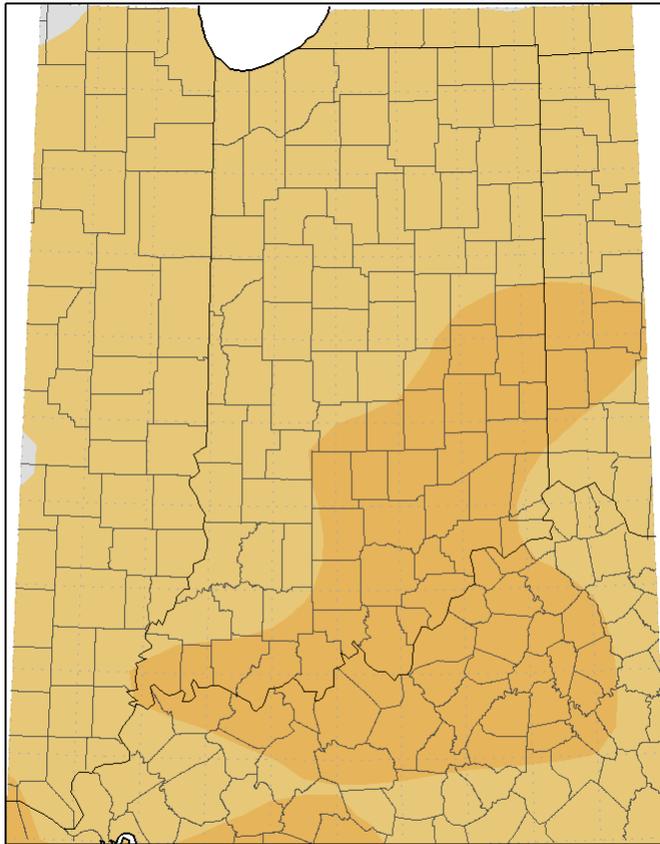


Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 6/5/2014 10:27:45 AM CDT

Average Temperature (°F): Departure from Mean
May 1, 2014 to May 31, 2014



Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 6/5/2014 10:28:37 AM CDT

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

D1 Drought - Moderate

D2 Drought - Severe

D3 Drought - Extreme

D4 Drought - Exceptional

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

Percent Area in U.S. Drought Monitor Categories

Week	Nothing	D0-D4	D1-D4	D2-D4	D3-D4	D4
6/3/2014	100.00	0.00	0.00	0.00	0.00	0.00
5/27/2014	100.00	0.00	0.00	0.00	0.00	0.00
5/20/2014	100.00	0.00	0.00	0.00	0.00	0.00
5/13/2014	100.00	0.00	0.00	0.00	0.00	0.00
5/6/2014	100.00	0.00	0.00	0.00	0.00	0.00

May 6th Drought Summary



May 13th Drought Summary



May 20th Drought Summary



May 27th Drought Summary

