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## Indiana State Climate Office

### Monthly Weather Report

**Jun 8, 2011**



<http://www.iclimate.org>

## May 2011 Climate Summary

### Month Summary

The hyperactive weather pattern of April in Indiana continued its run through May. Add to this spring's Indiana weather extremes list another 23 confirmed tornadoes in May. Also of note is the extreme hail falling out of thunderstorms. There have been multiple dates this month with hail stones 3 inches, even 4 inches in diameter, somewhat of a rarity in Indiana.

Cool and warm spells flipped regularly throughout May at about 6 day intervals. The net result was a balanced May which averaged very near the 30-year normal in temperature. The state average temperature was 62.0°, placing the month near the middle of the pack as the 55<sup>th</sup> warmest May on record in Indiana since 1895. Last year's May temperature of 64.3° was warmer and ranked in 25<sup>th</sup> place. The day split in May 2011 was 16 days of above normal temperature, 14 days of below, and 1 day at normal temperature. The daily mean temperature was more than 10° below normal on 3 dates and on 5 days was more than 10° above normal. The highest recorded temperature of the month was 95° on May 31<sup>st</sup> at Vincennes. The coldest observed temperature was 28° at Wanatah on May 5<sup>th</sup>.

The state average precipitation total of 6.65 inches ranks May 2011 as the 13<sup>th</sup> wettest May on record in Indiana. The most recent wetter May came in 2004 when the state precipitation was 7.27 inches. Honors for the single wettest day in May 2011 among CoCoRaHS reporters goes to Holland with 5.08 inches recorded on May 2<sup>nd</sup>. The CoCoRaHS volunteer in Wabash measured 3.90 inches on May 15<sup>th</sup>, the second highest daily rainfall this month. Regionally May precipitation averaged about 6.6 inches in northern Indiana, 5.9 inches in central, and 7.1 inches in the south. These totals are about 170% of the normal amount in northern Indiana and around 140% of normal in central and southern Indiana.

Severe weather was noted on 9 days this May, most of these during the last week of the month. The standout day was May 25<sup>th</sup> when 21 confirmed tornadoes were reported from across all areas of the state. Hail was frequent and especially damaging this month with unusually large stones. As expected in such storms high winds slammed hundreds of trees into power lines, flipped vehicles on interstates and other highways, and destroyed many buildings. There were several injuries due to falling debris this month. Southern Indiana residents continued to battle flooding impacts left over from late April. Week by week descriptions and details of these many severe events and their impacts are found in the narratives which follow below.

Spring planting progressed very slowly in May due to the persistent rainfall. By the end of the month the Indiana Agricultural Statistics Service reported that only 59% of corn had been planted in

Indiana while just 25% of soybeans were in the ground. Many farmers must decide whether to forego planting attempts and take prevented planting payments if the weather doesn't improve significantly as June gets underway.

### **May 1<sup>st</sup> – 7<sup>th</sup>**

The opening week of May was cold with statewide average temperatures below normal every day after May 1<sup>st</sup>. A cold front passed through Indiana on May 2<sup>nd</sup>, dropping temperatures from 3° above normal to 6° below normal. A high pressure center took control the next few days, transporting cooler air into the state and lowering temperatures a few more degrees to 9° below normal. A second cold front on May 6<sup>th</sup> triggered severe weather in western counties of the state that evening. At the close of the week an approaching storm system was dragging warmer air ahead of it into Indiana, ending the week with temperatures just 1° below normal. Overall state temperatures averaged 5° below normal for the week. Typically at this point in May daily maximum temperatures should range from 68° to 74° north to south across Indiana. Normal daily minimums would be expected between 46° in northern counties to 52° in the southwest corner of the state.

Rainfall this week was heavy the first few days then light the rest of the week. The April pattern with the heaviest rainfall in southern Indiana trending lighter northward across the state continued into the new month. Regionally for the week about 0.4 inch of rain was recorded in northern Indiana, around 1.8 inch in central sections, and 3.7 inches in southern Indiana. These totals are near 60% of normal in the north, just about double normal in central Indiana, and nearly triple normal in the south. The largest single day rainfall measurement was 5.08 inches made by the CoCoRaHS observer in Holland on May 2<sup>nd</sup>. Other heavy amounts that day include 3.63 inches in Evansville, 3.62 inches in Huntingburg, 3.59 inches at Paoli, and 3.56 inches in Poseyville. The Holland observer also noted the highest weekly total rainfall with 6.79 inches. A few other CoCoRaHS totals were 5.57 inches in Paoli, 5.51 inches in Huntingburg, 5.47 inches in Jasper, and 5.31 inches at Evansville.

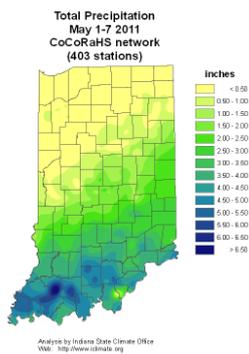
Flooding continues in Indiana due to the heavy rainfall of April and early May. The southwest part of Indiana, with its low elevation where the Wabash and Ohio Rivers join, faced the greatest challenges. Posey county remains under a state of emergency. The Red Cross has set up an emergency shelter for displaced families. Some schools in that county have cancelled classes where buses are unable to navigate flooded roads. New Harmony battled its highest river levels since May 1943 and sandbagging continued as water leaked into basements in that town. A furnace fire erupted in one of those homes this week as flood waters rose. In adjacent Vanderburgh county, about 50 roads have closed due to flooding.

By May 6<sup>th</sup> the rivers of southern Indiana had crested, some at or above their record flood level, and were receding. The previous record flood level at several points along the Ohio River had occurred in February 1937. Indiana residents and businesses affected by the flooding were asked to go to the Indiana Department of Homeland Security web site and fill out a damage assessment questionnaire.

Individual counties were already at work compiling their own damage assessments. In Vanderburgh county the commissioners office was creating a roster of all damaged buildings to arrive at a county wide estimate. These figures are to be sent to state government where the data

will be combined with estimates from other flood impacted counties. A final disaster declaration request would then be assembled by the governor and sent to federal disaster officials for approval.

On the evening of May 6<sup>th</sup> severe weather returned to Indiana but this time was limited to west central counties bordering Illinois. There were 7 reports of hail ranging in diameter from 1.0 to 1.5 inch received from Newton, Vermillion, Clay, and Vigo counties. In Parke county a rotating wall cloud was reported while in Vigo county a hole in the roof of a Terre Haute theatre was noted, likely damaged by high winds.



## May 8<sup>th</sup> – 14<sup>th</sup>

This week featured the flip side of last week's cold and heavy rainfall. Daily state average temperatures were above normal every day this week except the last. The week began 2° above normal but climbed quickly to 10° above normal by May 10<sup>th</sup>, then peaked at 13° above normal the next two days. A stationary front along the Ohio River at the start of this week had pulled northward as a warm front but then stalled again near the Michigan border. A narrow but intense wedge of warm air settled on Indiana and cooked into a summer like air mass beneath an upper atmospheric ridge. The stationary front transformed into a cold front and plunged southward across Indiana on May 14<sup>th</sup>. The warmth departed rapidly with temperatures crashing to end the week right at normal. For the week overall state temperatures averaged 8° above normal. Usually in this second week of May daily maximum temperatures should range between 72° and 78° north to south across Indiana. Normal daily minimums would vary from 49° in the far north to 55° in the southwest corner of the state.

Rain fell on all but two days early in the week but unlike recent weeks amounts were light. Regionally for the week about 0.8 inch fell in northern Indiana, 0.6 inch in central, and just 0.4 inch across the south. These totals are slightly higher than normal in northern areas, but only about 60% of normal in central Indiana and 40% of normal in the south. The wettest days occurred late in the week. Two CoCoRaHS observers in Attica noted 2.88 inches and 1.78 inches on May 13<sup>th</sup>. The Laporte volunteer recorded 1.79 inch on May 12<sup>th</sup> while in Demotte 1.73 inch was measured. Overall for the week 3.08 inches was received in Attica, one of the wettest spots in Indiana this

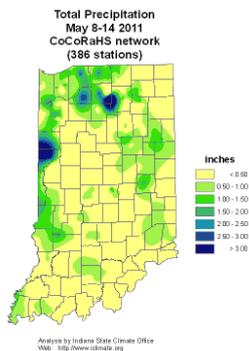
week. The Bourbon observer posted 2.85 inches while two Laporte totals were 2.67 and 2.66 inches for the week.

Rainfall was lighter this week but the state did not escape from yet another round of severe weather. On May 10<sup>th</sup> the National Weather Service received 17 reports of hail between 1.00 inch and 1.75 inch in diameter covering the ground from strong thunderstorms in Hamilton, Delaware, Madison, and Grant counties of central Indiana. In the early afternoon that day Delaware, Blackford, Grant, and Jay counties received another round of 1.00 to 1.75 inch hail. Car dents were common in Blackford and Grant counties where the larger size hail fell. The intensity of the storms grew and a few hours later hail up to 3.00 inches in diameter was observed in Adams county.

The next day on May 11<sup>th</sup> the hail threat moved westward to northwestern Indiana but was not quite as intense. Hail around 1.00 inch fell in Starke and Laporte counties while 1.75 inch diameter hail was noted in Porter county.

On May 13<sup>th</sup> high winds were the problem in advance of the strong cold front passage. Thunderstorm winds averaging 40 mph with gusts to 65 mph brought down branches in Marshall county and blew down tents and light structures in Delaware county. As the cold front barreled across Indiana the next day an unconfirmed tornado was reported to have touched down on I-69 in Delaware county. Local officials investigated but could not find any damage.

Meanwhile the shutdown of resorts around Lake Monroe could extend over the Memorial Day holiday due to recent heavy rainfall and flooding. Monroe county has been declared a natural disaster area and some roads were underwater in recreation areas.



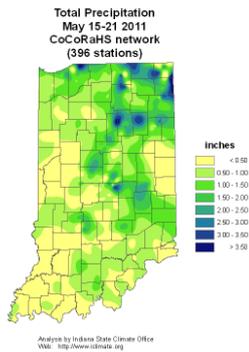
## May 15<sup>th</sup> – 21<sup>st</sup>

After a cool first week of May followed by a warm second week, temperatures reversed yet again into a mostly cool third week of the month. An upper atmospheric pressure trough early in the week transported cool air from Canada into Indiana. State average temperatures dropped from 9° below normal on May 15<sup>th</sup> to 14° below normal two days later, the coldest day of the week. The trough then moved east of our state, replaced by a high pressure ridge which allowed temperatures to rebound to 3° above normal by the weekend. As the week came to a close a warm front was fast approaching. Overall for the week state temperatures averaged a chilly 6° below normal. Usually in this third week of May daily maximum temperatures should vary from 75° in far northern Indiana to 81° in southwest counties. Normal daily minimums would range from 52° in the north to 58° in far southwest Indiana.

It was a wet week with rain falling every day. Rain amounts were moderate the first couple days but were light the remainder of the week. It seemed odd as rain showers moved “backwards” on the radar from east to west. The upper atmospheric pressure trough had intensified into a closed low center that settled south of Indiana. Rain showers were caught in this westbound wind flow on the north side of the counter-clockwise spinning low center. Regionally for the week rainfall totaled about 1.3 inch in northern Indiana, 0.9 inch in central areas, and nearly 0.6 inch across southern sections. These totals were near one and a half times normal in the north, right about normal in central, and about 60% of normal in southern Indiana. The heaviest daily rainfall was observed by CoCoRaHS reporters on the morning of May 15<sup>th</sup>. On that day 3.90 inches was measured at Wabash, 3.58 inches at Huntington, 3.47 inches in Angola, and 3.11 inches at Goshen and Laporte. Some heavier weekly totals included 3.49 inches in Huntington, 3.41 inches at Laporte, 3.36 inches in Goshen, and 3.29 inches at Hudson.

Governor Daniels this week declared a disaster emergency for 34 counties in southern Indiana devastated by flooding caused by the storms and heavy rain since April 18<sup>th</sup>. The declaration covered the period starting then and continuing for 30 days. Under the declaration the state department of Homeland Security can provide emergency services to these counties and is a first step needed to request federal disaster assistance. Counties included in the declaration were: Benton, Clark, Clay, Crawford, Daviess, Dearborn, Dubois, Floyd, Franklin, Gibson, Harrison, Jackson, Jefferson, Jennings, Knox, Lawrence, Martin, Monroe, Ohio, Orange, Parke, Perry, Pike, Posey, Putnam, Ripley, Scott, Spencer, Starke, Sullivan, Switzerland, Vanderburgh, Warrick and Washington. These counties noted severe damage to roads, property, and utilities, as well as other flood damages. The state had received over 350 damage reports from individuals including 80 reports from Dubois county alone.

The wet spring has critically delayed the planting season for Indiana farmers. The Indiana Agricultural Statistics Office reported that as of May 22 only 49% of the state corn crop has been planted compared to the normal 76% by this time. Soybean planting was 17% complete compared to the average 43% at this time in May. One independent estimate is that at best Indiana will possibly lose 137 million bushels of potential corn yield at a cost of \$961 million, and at worst could lose 203 million bushels worth \$1.4 billion.



## May 22<sup>nd</sup> – 31<sup>st</sup>

After a short break severe weather returned yet again to Indiana on sequential days as May drew to an end. A warm air mass enveloped Indiana at the start of this interval lifting statewide average temperatures to 7° above normal. A 4-day battle between warm and cold air masses ensued, resulting in heavy rainfall and extensive storm damage across Indiana. Temperatures at 5° above normal on May 25<sup>th</sup> fell to 10° below normal two days later. A new storm system approached Indiana on May 29<sup>th</sup>, allowing warmer air to return and temperatures to rebound to 12° above normal to close out the month. Over the 10 days temperatures averaged 4° above normal. Daily maximum temperatures this time of year typically range between 76° and 82° north to south across Indiana. Daily minimums normally vary from 54° in the far north to 60° in the far southwest.

The constant presence of fronts in the vicinity of Indiana insured a wet and stormy week. Rain fell on each of the 10 days, most heavily near the middle of the interval with light amounts on the final few days. Regional totals for the interval were about 4.1 inches in northern Indiana, and near 2.6 inches in central and southern areas. These totals are about 270% of normal in the north, 170% in central, and 150% of normal in southern Indiana. The heaviest single day amounts included 3.78 inches at Rensselaer recorded on May 25<sup>th</sup>, while the next day Chesterton noted 3.44 inches and Highland 3.36 inches. The CoCoRaHS observers at Merrillville and St John each received 3.32 inches in the rain gauge that morning. Rainfall totals for the 10 day interval were impressive. Complete totals included 7.29 inches in Fort Wayne, 6.90 inches at Otterbein, and 5.51 inches in West Lafayette. The Huntington observer noted 5.45 inches, with St John coming in at 5.43 inches. The Rensselaer gauge totaled at 5.39 inches.

Severe weather was a near every day occurrence during this time. On May 22<sup>nd</sup> a confirmed EF-1 tornado struck Jasper county, causing \$100,000 in damage to 3 buildings on the north side of Rensselaer. Power lines were brought down with this storm, and lightning started some homes on fire in Noblesville. A dozen hail reports in the center of the state included one report of 3-inch diameter hail in Marion county, although 1 to 2 inch hail was most common. A few hail storms also occurred in the far northwest and southeast corners of the state with high winds which brought down trees on cars and roads, flipped camping trailers, and caused barn damage.

Storm damage continued the next day. An EF-0 tornado was confirmed in Ripley county with 4 other unconfirmed tornado reports. Fifteen hail reports were received mostly from southern counties, with most stones in the 1.00 to 1.75 inch diameter size. But the bulk of damage this day was from high winds. At least 60 wind damage reports were received from across the state, most involving downed trees and power lines across highways. One person was injured when a tree snapped and fell on her. A few barns, grain bins, and hog buildings were destroyed, homes and garages were damaged, and trucks and trailers flipped on the interstate highways. In Monroe county 20 people had to leave their homes to stay in Red Cross shelters.

May 24<sup>th</sup> was a much quieter day. Only 3 reports of hail were made from Grant and Pulaski counties. Hail stones ranged from 1.00 inch to 1.75 inch.

Evidently May 24<sup>th</sup> was the infamous “quiet before the storm”. The next day 21 confirmed tornadoes erupted all across Indiana. More than 90 hail reports were made along with just as many wind damage reports. This table lists the confirmed tornadoes with the county location, classification, and path length on May 25<sup>th</sup>.

**Indiana Tornado Reports on May 25, 2011**

County	Tornado Statistics	County	Tornado Statistics
Newton	EF2 - path 2.0 miles	Lawrence	EF1 - path 3.2 miles
Newton	EF0 - path 200 yards	Lawrence	EF1 - path 2.8 miles
Jasper	EF1 - path 3.0 miles	Gibson	EF2 - path 13.0 miles
Jasper	EF1 - path 2.0 miles	Pike	EF1 - path 5.0 miles
Huntington	EF2	Pike	EF1 - path 4.0 miles
Parke	EF1 - path 1.0 mile	Dubois	EF2 - path 1.9 mile
Shelby	EF0 - path 0.8 mile	Dubois	EF1
Decatur	EF1 - path 1.0 mile	Orange	EF2 - path 4.7 miles
Decatur	EF1 - path 0.5 mile	Orange	EF1
Monroe	EF1 - path 1.0 mile	Washington	EF1
Lawrence	EF2 - path 3.3 miles		

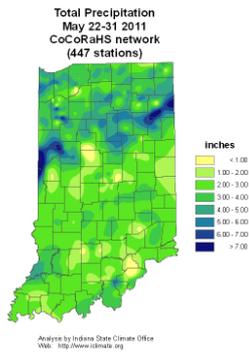
In east Lawrence county cars, homes, mobile homes, and other buildings were destroyed by tornadoes. At least a dozen residents were hurt there. In Monroe county a mobile home park was hit injuring 6 people. One person was injured by a falling tree in Bartholomew county. Hail stones around Indiana ranged in size from 1.0 inch to an extreme 4.0 inches in diameter in Decatur county, commonly compared to as “grape fruit” size! Airport hangars were badly damaged in Greensburg and 8 people were injured in that city. High winds throughout Indiana damaged homes, blew off barn roofs and brought down power poles, pole barns, and of course lots of trees. At least 68,000 homes were left without power across the state. In total at least 34 people were injured across Indiana during this severe weather day.

Windy conditions continued into May 26<sup>th</sup>. One person was injured in Warrick county when a tree fell on his home. Nearby a store was set on fire, likely due to downed power lines.

Another round of thunderstorms on May 28<sup>th</sup> produced scattered hail in central Indiana. Five reports of hail varying in size between 1.0 inch and 1.75 inch were received but no wind damage or tornadoes occurred that day.

The weather action moved to northern Indiana on May 29<sup>th</sup>. There were 29 reports of wind damage generally north of a Rensselaer to Fort Wayne line. One storm produced 1.0 inch hail in Steuben county.

Finally on the last day of May the stormy weather moved north of Indiana along with the warm front. Only 3 reports of wind damage were received, all from St Joseph county this day. A strong Bermuda ridge of high pressure is building westward towards the Midwest as May ends, giving Indiana a burst of summer weather just as June arrives.



## May 2011

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	60.6	60.8	-0.1
North Central	61.1	60.3	0.9
Northeast	61.3	59.8	1.4
West Central	62.5	62.3	0.2
Central	62.4	61.7	0.7
East Central	62.2	60.8	1.4
Southwest	64.8	64.6	0.2
South Central	64.1	63.9	0.2
Southeast	63.3	63.0	0.3
<b>State</b>	<b>62.5</b>	<b>62.0</b>	<b>0.5</b>

Region	Precipitation	Precipitation		Percent of Normal
		Normal	Deviation	
Northwest	5.83	3.98	1.86	147
North Central	6.50	3.85	2.65	169
Northeast	7.47	3.78	3.70	198
West Central	5.14	4.38	0.76	117
Central	6.03	4.40	1.63	137
East Central	6.37	4.31	2.06	148
Southwest	6.99	4.99	2.00	140
South Central	7.32	5.00	2.31	146
Southeast	6.97	4.85	2.12	144
<b>State</b>	6.47	4.40	2.06	147

### Spring 2011 (March - May)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	49.6	49.6	0.0
North Central	49.3	49.0	0.3
Northeast	48.9	48.5	0.4
West Central	52.5	51.5	1.0
Central	52.3	50.9	1.4
East Central	51.6	49.9	1.7
Southwest	56.2	54.7	1.5
South Central	55.7	54.1	1.6
Southeast	54.6	53.1	1.5
<b>State</b>	52.4	51.4	1.0

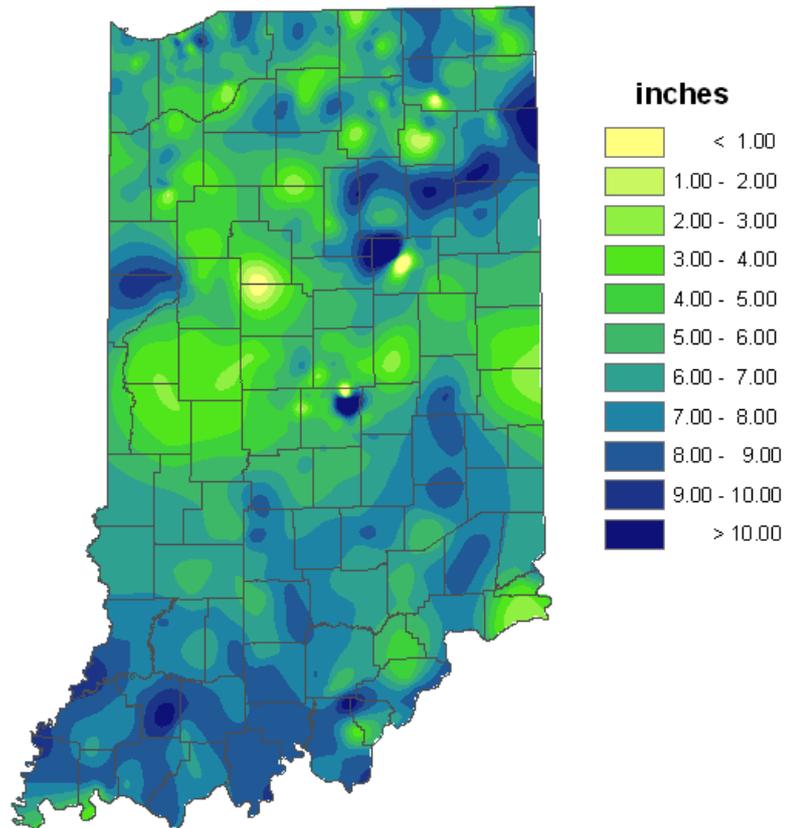
Region	Precipitation	Precipitation		Percent of Normal
		Normal	Deviation	
Northwest	15.71	10.50	5.21	150
North Central	16.14	10.22	5.92	158
Northeast	16.40	9.96	6.44	165
West Central	17.29	11.61	5.67	149
Central	19.27	11.59	7.68	166
East Central	19.41	11.16	8.25	174
Southwest	23.74	13.66	10.07	174
South Central	24.72	13.59	11.14	182
Southeast	24.95	13.01	11.94	192
<b>State</b>	19.68	11.74	7.93	168

## 2011 Annual so far

<b>Region</b>	<b>Temperature</b>	<b>Temperature</b>	
		<b>Normal</b>	<b>Deviation</b>
Northwest	39.3	40.1	-0.7
North Central	39.1	39.7	-0.6
Northeast	38.7	39.3	-0.6
West Central	42.1	42.1	0.0
Central	42.1	41.7	0.4
East Central	41.4	40.8	0.6
Southwest	46.5	45.9	0.6
South Central	46.1	45.5	0.6
Southeast	45.1	44.5	0.6
<b>State</b>	42.4	42.3	0.1

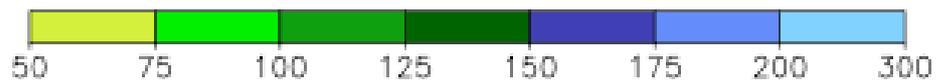
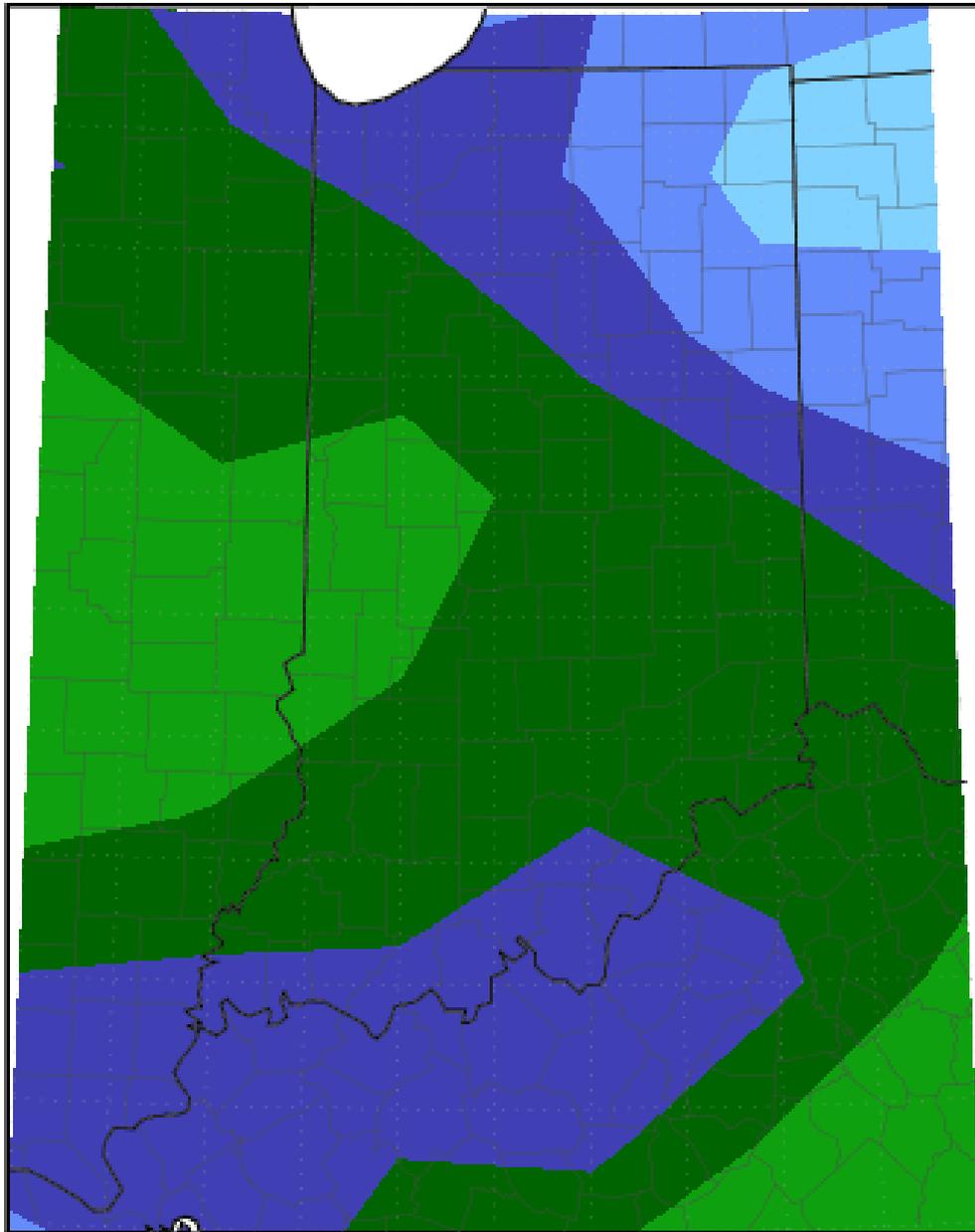
<b>Region</b>	<b>Precipitation</b>	<b>Precipitation</b>		
		<b>Normal</b>	<b>Deviation</b>	<b>Percent of Normal</b>
Northwest	19.91	14.05	5.86	142
North Central	20.72	14.07	6.65	147
Northeast	21.39	13.72	7.67	156
West Central	23.27	16.06	7.21	145
Central	26.26	16.20	10.05	162
East Central	26.54	15.60	10.94	170
Southwest	29.35	19.54	9.81	150
South Central	30.23	19.61	10.62	154
Southeast	31.25	18.82	12.44	166
<b>State</b>	25.38	16.46	8.92	154

**Total Precipitation  
May 2011  
CoCoRaHS network  
(440 stations)**



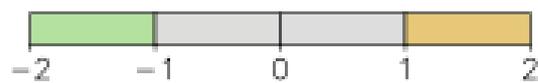
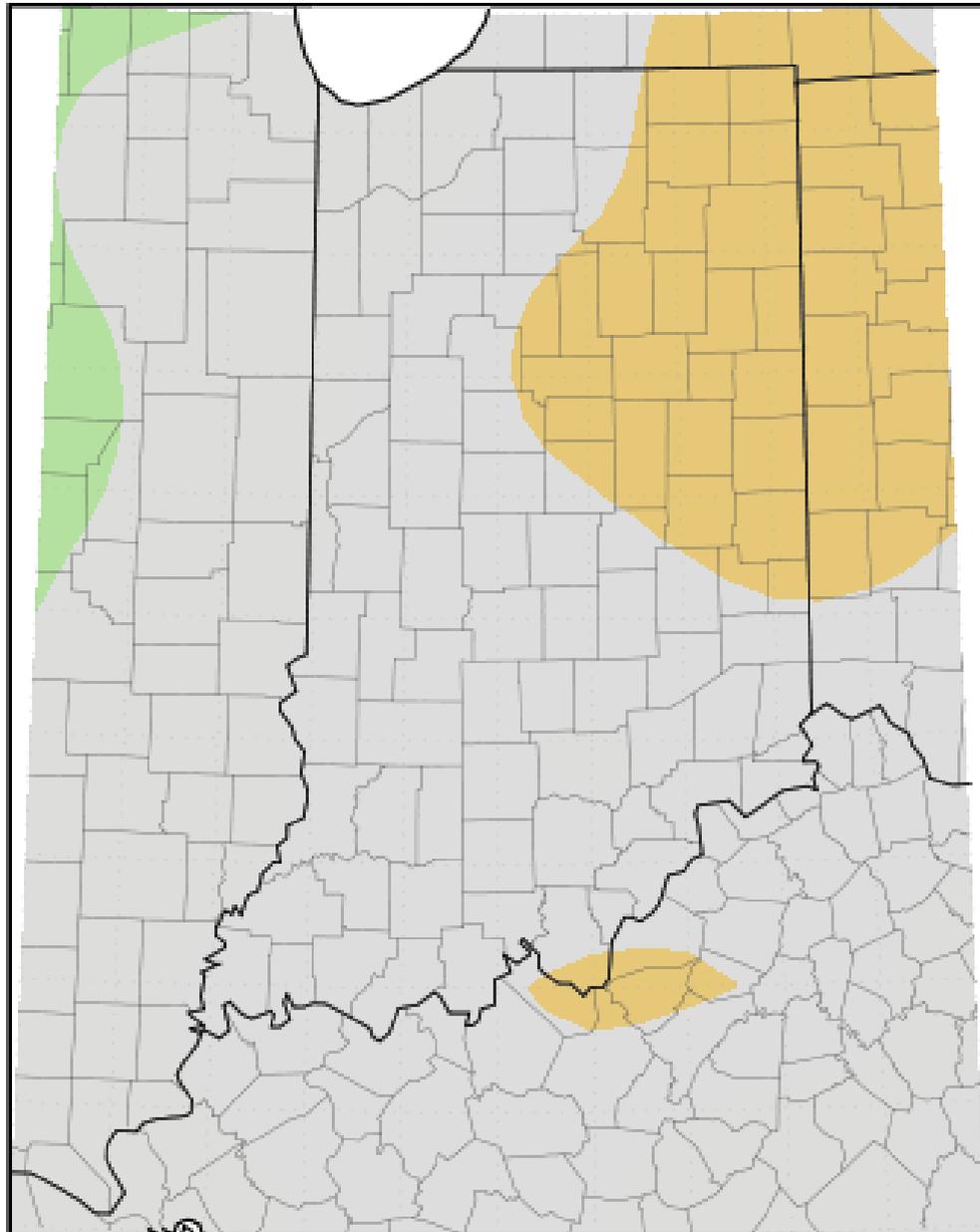
Analysis by Indiana State Climate Office  
Web: <http://www.iclimat.org>

Total Precipitation: Percent of Mean  
May 1, 2011 to May 31, 2011



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

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



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, May 31<sup>st</sup> has 100.0% of Indiana under no drought, and 0.0% of Indiana under at least D0 through D4 drought status. Please note, however, that these areas are not exact, and much of this drought map has been created from reports throughout the state and estimation, so use this information as a general view rather than for specifics.

Intensity:



### Drought Condition (Percent Area): Indiana

Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
05/31/11	100.00	0.00	0.00	0.00	0.00	0.00
05/24/11	100.00	0.00	0.00	0.00	0.00	0.00
05/17/11	100.00	0.00	0.00	0.00	0.00	0.00
05/10/11	100.00	0.00	0.00	0.00	0.00	0.00
05/03/11	100.00	0.00	0.00	0.00	0.00	0.00

*May 3<sup>rd</sup> Drought Summary*



*May 10<sup>th</sup> Drought Summary*



*May 17<sup>th</sup> Drought Summary*



*May 24<sup>th</sup> Drought Summary*



*May 31<sup>st</sup> Drought Summary*

