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and  
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## Indiana State Climate Office

### Monthly Weather Report

**Nov 4, 2011**



<http://www.iclimate.org>

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## October 2011 Climate Summary

### Month Summary

October weather evolved as a two part story. Weather conditions the first half of the month featured many sunny days, warm temperatures, and little rainfall. In contrast the second half was cloudy, cold, and stormy. Fit the halves together and October statistics reveal a month with temperatures very close to normal with precipitation totals slightly on the wet side. There was a significant storm on October 20<sup>th</sup> but severe weather damage was absent this month in Indiana.

Temperatures the first half of October averaged about 3.2° above normal, equally balanced by an average 3.3° below normal the second half. For the complete month state temperatures averaged to 54.0° which is 0.1° above or essentially right at normal. The day split was 16 days of below normal temperatures, 1 day at normal, and 14 days with above normal temperatures. There were 2 days this month when the daily state average temperature was at least 10° colder than normal and 3 days with the daily average at least 10° warmer than normal. The highest temperature of the month in Indiana was 88° on October 8<sup>th</sup> at Terre Haute. The coldest temperature was 23° at Wanatah on October 30<sup>th</sup>.

State average rainfall in October was 3.32 inches, or 0.42 inch above normal. This amount ranks this month as the 42<sup>nd</sup> wettest October since 1895. The most recent wetter October occurred in 2009 when its 6.79 inches was good for 4<sup>th</sup> place in the record books. But the 7.72 inches recorded in 2001 ranked even higher in 2<sup>nd</sup> place. On a regional basis October 2011 precipitation was 130% of normal in northern Indiana, about 120% of normal in central areas, and right at normal across the south. The heaviest single day rainfall was found in northern Indiana. Two CoCoRaHS observers in Mishawaka measured 2.92 and 2.79 inches at their rain gauges on the morning of October 20<sup>th</sup>. Nearby the Winona Lake volunteer recorded 2.85 inches that day.

The autumn drought hung on through the first half of October. When significant rains returned to the state in mid-month the final remnants of the Indiana 2011 drought which had begun in mid-July were eliminated.

There was no severe weather damage this month but high wind and lakeshore flood warnings were issued for the Lake Michigan shore line of far northwest Indiana on October 19<sup>th</sup> and 20<sup>th</sup>. Wave heights of 10 to 15 feet were common across the lake with some reports of 20 to 25 foot waves in adjacent states. A storm system from Arkansas which eventually nearly circled Indiana, had merged twice with other low pressure centers before racing north to Michigan as a greatly intensified storm.

## October 1<sup>st</sup> – 8<sup>th</sup>

October began with a shiver. The daily state average temperature on October 1<sup>st</sup> was near 11° below normal with Indiana on the tail end of a departing storm system. A strong ridge of high pressure moved in the next day and would begin to ramp up Indiana temperatures each day for the rest of the week. By October 4<sup>th</sup> temperatures had rebounded to normal as the high pressure center had moved east to Ohio from Wisconsin and replaced northerly winds over Indiana with warmer winds from the south. The warm up continued and by October 6<sup>th</sup> state average temperatures had reached 7° above normal. A new cold front in Michigan was now poised to enter our state and end the warming spell but Indiana temperatures continued to rise, peaking at almost 12° above normal. The dry air on each side of the front had mixed such that the cold front dissolved. The high pressure centers on each side of the old front now merged into an even stronger ridge sprawling the eastern half of the country, extending the week of sunny skies and warm temperatures a bit longer. Daily state average temperatures on October 8<sup>th</sup> held at near 11° above normal, or 22° warmer than when the week began. The steep transition from cold to warm conditions resulted in an average weekly temperature of just 1° above normal. Typical daily maximum temperatures the opening week of October range from 69° in far northern Indiana to 78° in the extreme southwest. Normal daily minimums would vary between 47° to 51° north to south across the state.

Generally only a few hundredths inch of rain fell the first day of the month across Indiana. The rest of the week was pleasant and dry with a long string of warm sunny days. For the week rain amounts averaged near 0.05 inch in northern Indiana and only trace amounts in central and southern regions. These totals are less than 10% of normal in the north. Local moderate showers were all limited to about a half inch or less for the week. The highest rain totals reported by CoCoRaHS observers included 0.57 inch in Gas City, 0.41 inch at Kingsbury, and 0.36 inch in Anderson. These amounts all came on a single day.

The October 4<sup>th</sup> edition of the National Drought Monitor indicates the late September rains continued to help alleviate the late summer drought in Indiana. Another third of the state area was restored to drought free conditions since the previous week, as the 55% of Indiana in no drought status improved to 89% of the state area. The 39% area coverage of abnormally dry (D0 category) soils improved to just 9% of total area by October 4<sup>th</sup>. Finally the 6% of total area classified in moderate drought (D1 status) improved to 2% of the area in that class. The only two remaining drought areas in Indiana are the west border counties of west central Indiana surrounding Terre Haute, and the extreme north central Indiana areas of Laporte, St Joseph, and Elkhart counties. The most intense drought area continues to be in Vermillion and Vigo counties.

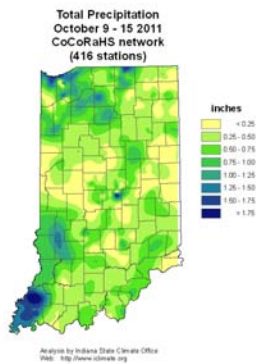


## October 9<sup>th</sup> – 15<sup>th</sup>

A strong ridge of high pressure sustained mostly sunny skies across Indiana for 10 days after it arrived on October 2<sup>nd</sup>. After a very chilly start temperatures had rebounded sharply a week ago to 11° above normal. As this second week began daily average temperatures held steady at near 9° above normal. Indiana was set in a large sector of warm air bounded by two stationary fronts, one across northern Michigan, and the second stretching from North Dakota to Texas. Both fronts dissolved and did not impact Indiana. On October 12<sup>th</sup> the ridge moved east of our state. A storm system followed, and by October 14<sup>th</sup> a cold front had immediately followed a warm front, the only fronts to traverse Indiana this week. Cold and windy conditions behind the fronts allowed temperatures to slip a little more each day, ending the week at 1° below normal. For the week overall daily temperatures averaged 5° above normal. Typically this second week of the month daily maximum temperatures should vary between 66° and 74° north to south across Indiana. Normal daily minimums range from 46° in the far north to 49° in southwest counties.

The first half of the week was dry under the influence of the strong ridge. Then rain arrived along with the pair of fronts. There was no severe weather associated with these fronts. On average for the week about 0.5 inch of rain fell in northern Indiana, 0.4 in central areas, and 0.7 inch across the south. These totals are about 80% of normal in central Indiana, 110% of normal in the north, and 130% of normal in the southern region. As expected there were spots with locally heavier rainfall. The CoCoRaHS reports of October 13<sup>th</sup> mention 1.98 inch in Princeton, 1.80 inch at Patoka, and 1.56 inch in Evansville. Some of the weekly rainfall totals include 1.60 inch and 1.55 inch at two Porter locations while Francisco noted 1.54 inch. Melody Hill had 1.51 inch.

The October 11<sup>th</sup> edition of the National Drought Monitor indicates no change in drought status throughout Indiana this week as weekly rainfall did not deviate far from normal.



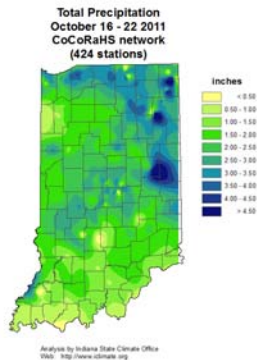
## October 16<sup>th</sup> – 22<sup>nd</sup>

Last week's warm temperatures have vanished as every day but one this week was cooler than normal. A warm front moved through Indiana on October 16th, quickly followed by a cold front the next day. State average temperatures which began at 4° above normal dipped to nearly 7° below normal. A massive storm system over Hudson Bay had pushed these fronts through to start the week before falling apart. A second storm from Arkansas made the greater impact on Indiana this week as it circled our state, merging twice with other low pressure centers along the way. The first merger over Tennessee intensified the storm over the eastern mountains. A second merger on October 20th with a low center over New Jersey redirected the storm northward to Michigan. High winds over northern Indiana impacted the Lake Michigan shore line as the storm continued to intensify into an occluded low center. The next day the storm raced northeast into Canada, calming weather conditions over Indiana to close the week. Daily average temperatures changed little during this latest storm, holding at about 4° to 5° below normal. For the week daily state temperatures averaged near 4° below normal. Typically in mid-October daily maximum temperatures should range from 62° to 70° north to south across the state. Normal daily minimums would vary from 43° in far northern counties to 46° in far southwest Indiana.

During the week a zonal wind flow pattern in the upper atmosphere had morphed into a split jet stream. The northern branch traveled west to east across far northern Canada while the second branch plunged southward, forming a deep cutoff low system in eastern states. This intense system promoted heavy rainfall over Indiana, especially in midweek. Regional rainfall totals were about 2.5 inches across northern and central Indiana, and 1.6 inches in the south. These totals are about 1.7 times normal in southern Indiana but near three and a half times normal elsewhere. CoCoRaHS daily rainfall reports on October 20th included 2.92 inches at Mishawaka, 2.85 inches in Winona Lake, with reports from Fort Wayne and Goshen near 2.75 inches. For the week two Mishawaka observers noted 3.84 and 3.62 inches while the Goshen rain gage collected 3.55 inches. The Warsaw volunteer had 3.49 inches while Chesterton noted 3.45 inches.

High wind and lakeshore flood warnings were issued for the Lake Michigan shoreline of far northwest Indiana for October 19th and 20th. Wave heights of 10 to 15 feet were common across the lake with some wave reports of 20 to 25 feet in the Chicago region.

The heavier rainfall of late has virtually ended the autumn Indiana drought. The October 18th edition of the National Drought Monitor indicates that less than 1% of the total Indiana land area remains abnormally dry (D0 category). The start of abnormally dry conditions began on July 19<sup>th</sup> this year.

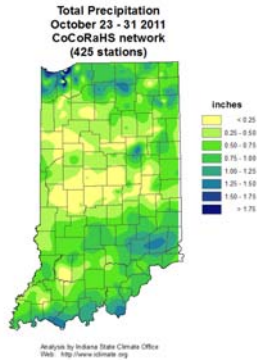


## October 23<sup>rd</sup> – 31<sup>st</sup>

The cooler than normal trend since mid-October carried through to the end of the month expect for a brief warm up from about October 24<sup>th</sup> through 26<sup>th</sup>. Wind flow patterns in the upper atmosphere were generally zonal (directly west to east) across the country, with mostly weak storms riding short pressure waves quickly across Indiana. Daily state temperatures were about 2° to 5° above normal during the 3 warmer days. Two cold fronts passed through Indiana after October 23<sup>rd</sup> but the first front was weak and had no impact on temperatures. The second front tapped into cold Canadian air and dragged temperatures more than 10° lower, settling at near 7° below normal during the final 4 days of the month. Two weak low pressure troughs passed through Indiana during these last few days to reinforce the cold air flow into the state. Overall for the 9 day interval daily state temperatures averaged 2° below normal. Usually daily maximum temperatures at the end of this month should vary from 60° in far northern Indiana to 67° in the extreme southwest. Normal daily minimums range from about 42° in our northern counties to 45° in the south.

Light rain showers came every day in northern Indiana. In the rest of the state rain fell mostly the first half of the interval with the cold fronts. Regionally for the 9 days about 0.7 inch fell in northern and southern areas with about 0.4 inch across central Indiana. These totals are near normal in northern Indiana, slightly above normal in the south and about 60% of normal in central sections. The heaviest local daily rainfall was measured the morning of October 27<sup>th</sup> by CoCoRaHS volunteers in southern Indiana. Some amounts included 1.18 inch in Mauckport and 1.17 inch in Evansville. Two Newburgh observers noted 1.16 and 1.12 inch that day. But the largest totals over the 9 days were found in northwest Indiana. CoCoRaHS numbers there included 1.50 inch in Gary, while two Valparaiso rain gauges recorded 1.49 and 1.44 inch. Two Portage volunteers noted 1.48 and 1.45 inches for the 9 day interval.

The October 25<sup>th</sup> edition of the National Drought Monitor states the 2011 Indiana drought has now ended. The entire state is considered drought free as the last 1% of area listed in abnormally dry status (D0 class) a week ago has received adequate moisture.



## October 2011

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	52.8	52.9	0.0
North Central	52.7	52.2	0.4
Northeast	52.3	51.8	0.5
West Central	54.1	54.1	-0.1
Central	53.7	53.5	0.3
East Central	52.9	52.7	0.3
Southwest	56.6	56.7	-0.1
South Central	55.7	56.0	-0.3
Southeast	54.8	55.2	-0.4
<b>State</b>	<b>54.0</b>	<b>54.0</b>	<b>0.1</b>

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	3.14	2.92	0.22	108
North Central	4.02	2.95	1.07	136
Northeast	3.98	2.70	1.27	147
West Central	3.13	2.90	0.24	108
Central	3.38	2.82	0.56	120
East Central	3.48	2.73	0.75	128
Southwest	2.87	3.04	-0.18	94
South Central	2.78	3.02	-0.23	92
Southeast	3.32	2.98	0.34	111
<b>State</b>	<b>3.32</b>	<b>2.90</b>	<b>0.42</b>	<b>114</b>

## Autumn 2011 (so far September - October)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	57.1	58.6	-1.5
North Central	57.0	58.0	-1.0
Northeast	56.8	57.6	-0.7
West Central	58.8	59.9	-1.1
Central	58.5	59.3	-0.8
East Central	57.8	58.5	-0.6
Southwest	61.5	62.4	-0.9
South Central	60.7	61.6	-0.9
Southeast	59.9	60.9	-1.1
<b>State</b>	<b>58.8</b>	<b>59.7</b>	<b>-1.0</b>

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	7.20	6.13	1.07	117
North Central	9.28	6.25	3.03	149
Northeast	9.67	5.90	3.77	164
West Central	7.24	5.93	1.31	122
Central	8.96	5.81	3.16	154
East Central	9.56	5.52	4.04	173
Southwest	8.84	6.18	2.66	143
South Central	8.47	6.13	2.35	138
Southeast	9.98	5.95	4.03	168
<b>State</b>	<b>8.72</b>	<b>5.99</b>	<b>2.73</b>	<b>145</b>

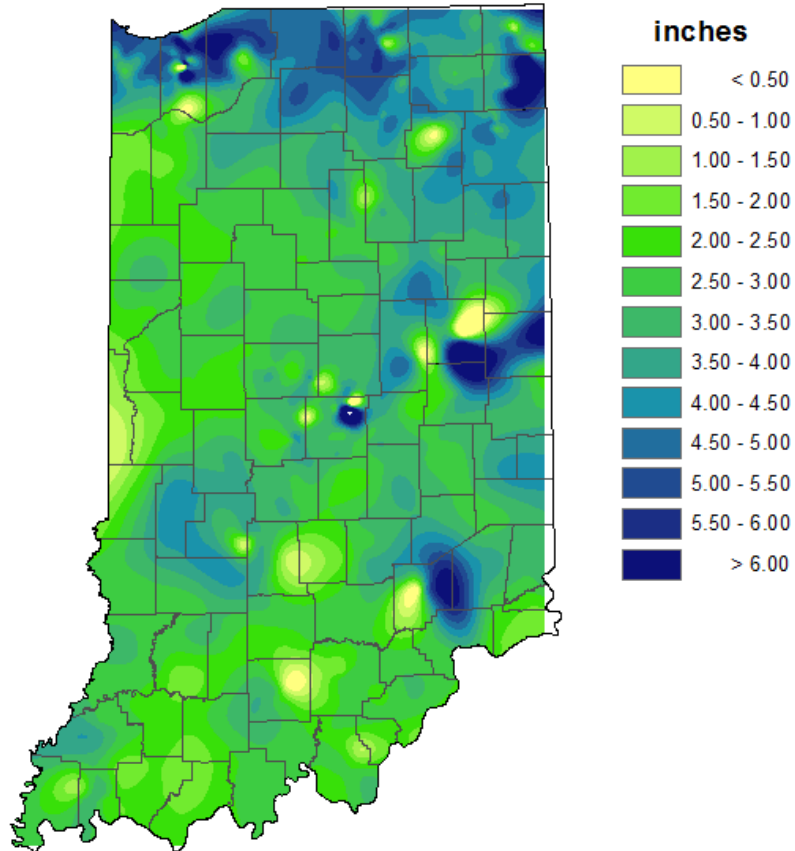
## 2011 Annual so far

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	53.2	53.4	-0.2
North Central	53.0	52.9	0.1
Northeast	52.8	52.5	0.3
West Central	55.3	55.0	0.3
Central	55.2	54.5	0.7
East Central	54.7	53.7	1.0
Southwest	59.0	58.1	0.9
South Central	58.5	57.5	1.0
Southeast	57.5	56.6	0.9
<b>State</b>	<b>55.6</b>	<b>55.0</b>	<b>0.6</b>

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	39.69	32.20	7.49	123
North Central	40.27	32.25	8.02	125
Northeast	39.31	31.04	8.27	127
West Central	40.07	34.67	5.40	116
Central	45.07	34.12	10.94	132
East Central	45.08	33.00	12.08	137
Southwest	50.85	37.75	13.10	135
South Central	50.77	38.06	12.71	133
Southeast	52.54	37.01	15.53	142
<b>State</b>	<b>44.79</b>	<b>34.53</b>	<b>10.26</b>	<b>130</b>

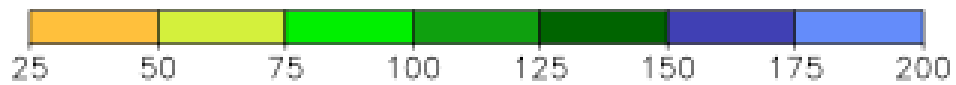
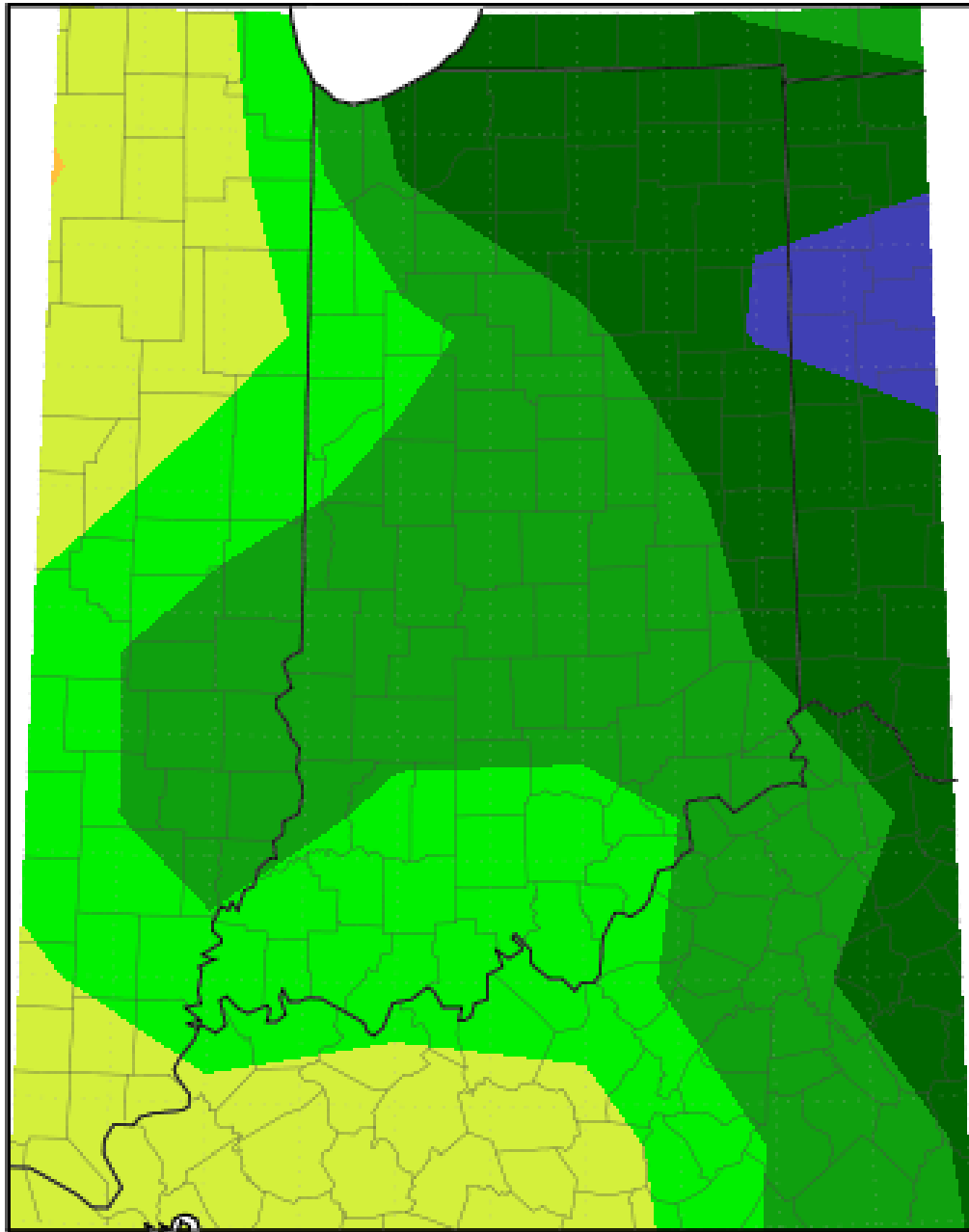


**Total Precipitation  
October 2011  
CoCoRaHS network  
(454 stations)**



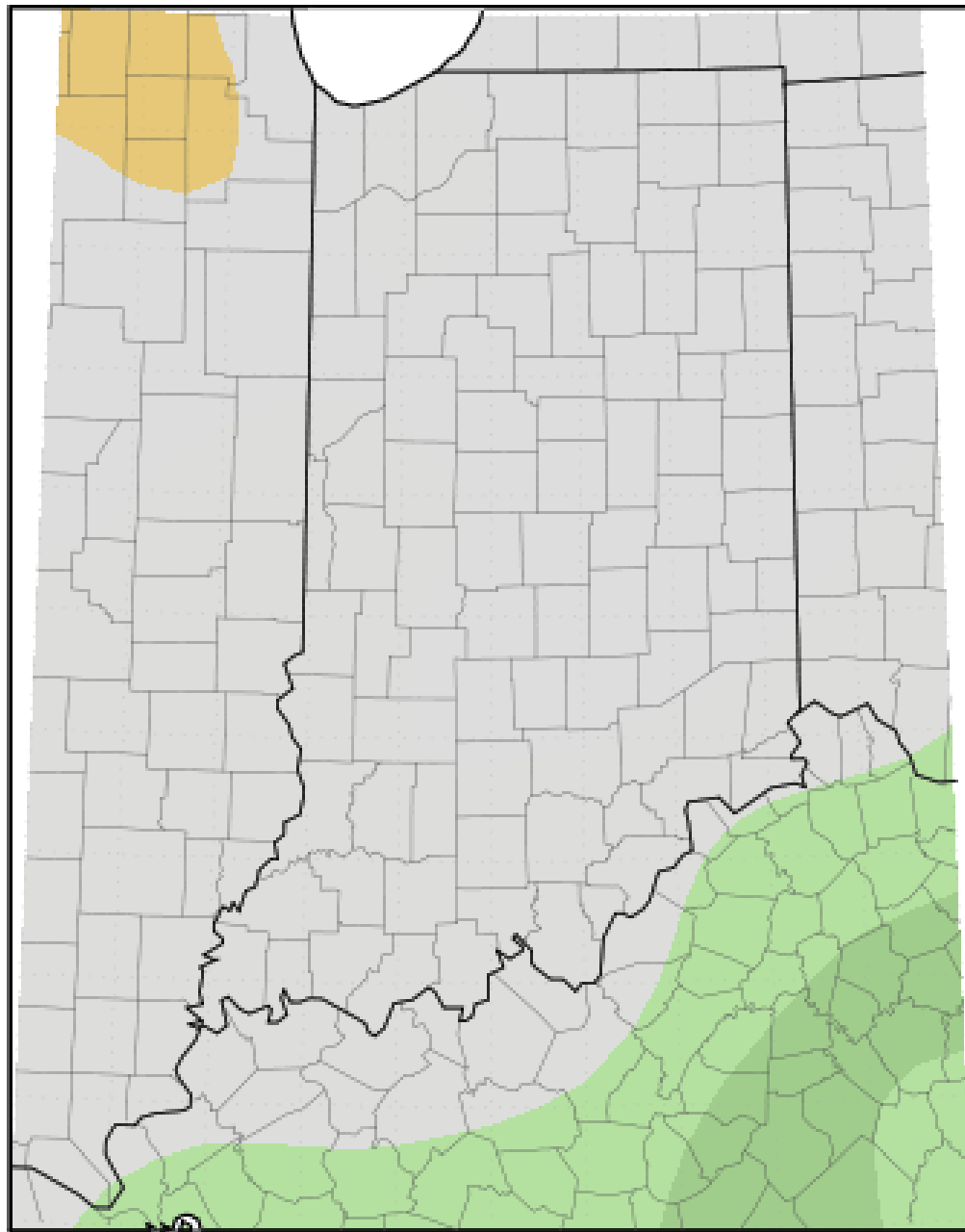
Analysis by Indiana State Climate Office  
Web: <http://www.iclimat.org>

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



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

Average Temperature (°F): Departure from Mean  
October 1, 2011 to October 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, October 4<sup>th</sup> has 1.7% of Indiana under at *least* D1-D4 drought status, 11.3% under at *least* D0 through D4 drought status, and 88.7% drought free. Subtracting the D1-D4 category (1.7%) from the D0-D4 category (11.3%), tells us that 9.6% of Indiana is in D0 category alone (abnormally dry). Please note, however, that these areas are not exact, and much of this drought map has been created from reports throughout the state and in estimation, so use this information as a general view rather than for specifics.

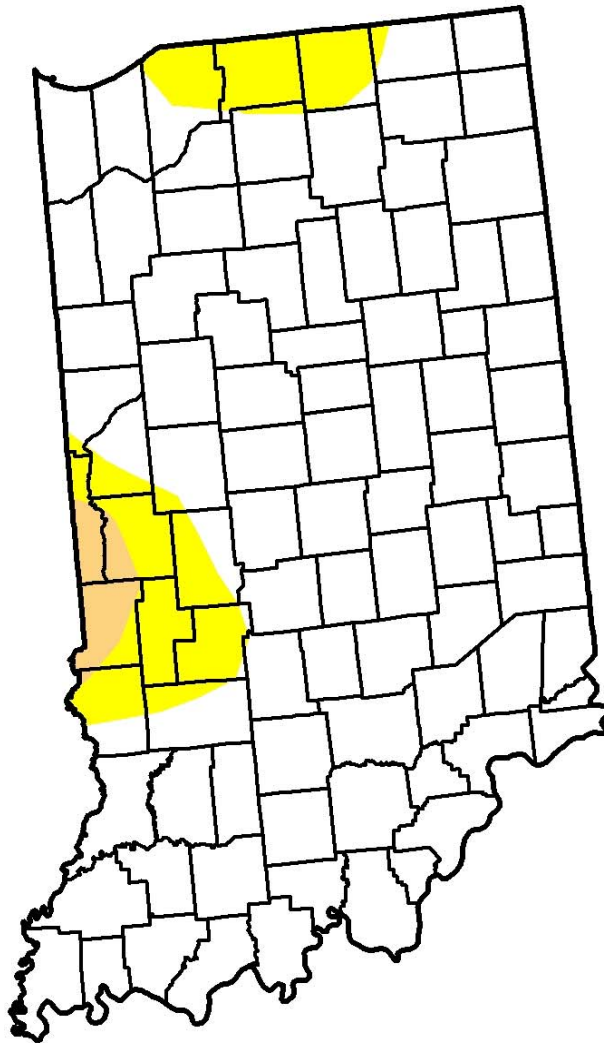
Intensity:



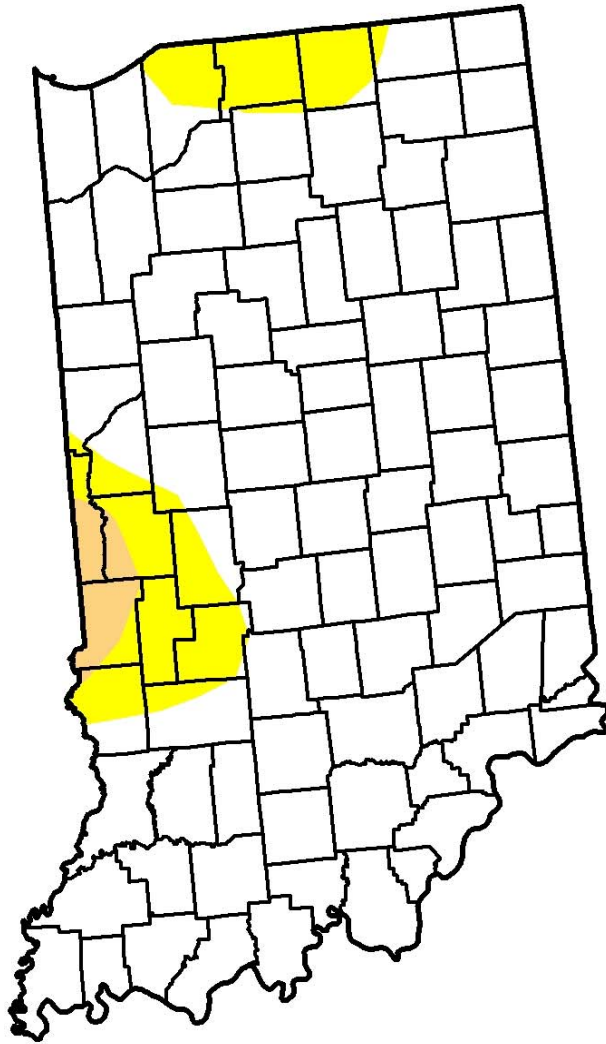
**Drought Condition (Percent Area): Indiana**

Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
11/01/11	100.00	0.00	0.00	0.00	0.00	0.00
10/25/11	100.00	0.00	0.00	0.00	0.00	0.00
10/18/11	99.70	0.30	0.00	0.00	0.00	0.00
10/11/11	88.74	11.26	1.73	0.00	0.00	0.00
10/04/11	88.74	11.26	1.73	0.00	0.00	0.00

*October 4<sup>th</sup> Drought Summary*



*October 11<sup>th</sup> Drought Summary*



*October 18<sup>th</sup> Drought Summary*



*October 25<sup>th</sup> Drought Summary*





*November 1<sup>st</sup> Drought Summary*

