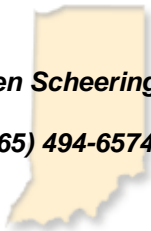


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## Indiana State Climate Office

### Monthly Weather Report



<http://www.iclimat.org>

**Sep 4, 2009**



## August 2009 Climate Summary

### Summary

After a six week absence summer like temperatures returned to Indiana on August 8<sup>th</sup>. The cool start to August yielded to the more typical heat and humidity for only a short dozen days. On August 20<sup>th</sup> the cool weather pattern of July reclaimed Indiana for the rest of the month. Overall there was more coolness than warmth as the statistics show August 2009 averaged 1.8F degrees below normal. This places the month at 23<sup>rd</sup> coldest among all Augusts since 1895. Other recent cold Augusts include 2004 (4<sup>th</sup> coldest), 1994 (8<sup>th</sup> coldest), and 1992, the second coldest August in the statewide rankings.

The conflict between warm and cold spells was not a quiet one. Severe weather events impacted three different regions of the state on August 4<sup>th</sup>, 17<sup>th</sup>, and 20<sup>th</sup>. The intense rainfall in these storms contributed to August rainfall totals averaging 4 to 5 inches in northern Indiana, 3 to 4 inches in central, and 2 to 4 inches in the south. These amounts are 10 to 30 percent higher than normal in the northern half of the state and 10 to 30 percent below normal in the southern half. The net statewide average precipitation for August was neutral, or right about normal for the month.

Widespread flooding, winds, and hail inflicted sudden and heavy damage to many south central and southeast Indiana counties on August 4<sup>th</sup> with locally heavy rainfall totals of 8 to 10 inches. Similar rain totals fell in Kosciusko county in northeast Indiana on August 17<sup>th</sup>, but the dry ground quickly absorbed the heavy rainfall and flash flooding was short lived. Three days later an EF2 tornado ripped through the town of Chesterton in northwest Indiana. Damage was intense and concentrated in town but not extensive enough to qualify for federal disaster assistance.

### August 1<sup>st</sup> – 10<sup>th</sup>

A persistent cold spell finally came to an end this week. After 40 consecutive days of below normal state averaged temperatures, summer time returned to Indiana on August 8. The polar jet stream that for so long had drained cold air out of Canada into Indiana has a new more eastward path. This is a response to the repositioning of the dominant Hudson Bay low pressure trough, now directing the spread of cold air eastward to the Atlantic.

The opening days of August were still cool with temperatures 4F degrees below normal. A very brief warm up by August 5<sup>th</sup> was cut short by another cold front the next day. But then the long cold pattern finally relented as a string of above normal temperature days began August 7<sup>th</sup> and continues at 6F degrees above the early August normal.

Precipitation amounts averaged only around a quarter inch in the northern third of the state the first ten days of August. In contrast extreme rain amounts drenched central and southeast Indiana, averaging more than two inches overall. Just over an inch was typical elsewhere around the state. Light amounts fell at the start of the week but the abundance of humid air over Indiana on August 4<sup>th</sup> triggered intense downpours and flooding to the southeast, especially in the Louisville vicinity. The weather turned mostly dry the rest of the period as the warmer pattern finally took hold.

While the lack of rain in recent weeks has northern Indiana residents watching for early signs of drought, the southern half of the state is weary of devastating floods, reminding many residents of the severe floods of only a year ago in June 2008.

The impact of severe storms this August 4<sup>th</sup> was massive as the convergence of two storm systems, just hours apart, inundated southern regions of the state. Some areas of Indiana reported 8 to 10 inch storm totals.

Franklin and Clark counties in southeast Indiana may have suffered the worst. Police said all routes west out of Batesville were "washed out" and most roads throughout the county were impassable. Traffic queues on I-74 near Batesville grew to nearly three miles long due to the immense flooding as police closed exits at Batesville and Greensburg until the next morning. The county was placed under a level two emergency, prohibiting all but emergency travel. Ten people were evacuated from mobile homes in Laurel while other residents were evacuated in Metamora but allowed to return to their homes later that day. A church in the area had opened as a shelter.

In Clark county more than 6 inches of rain fell in less than 90 minutes, shutting down I-65. About 20 people were rescued from flooded homes. Stranded vehicles were seen floating down the street in downtown New Albany.

There was extensive flooding to farmland and in some rural communities of Bartholomew, Jackson, and Scott counties. Officers rescued several stranded motorists caught in high water. National Weather Service radar estimated up to 7 inches of rain fell in rural Jackson and Brown counties on the morning of August 4<sup>th</sup>. Strong winds destroyed or damaged some homes, barns, and grain silos in rural areas of Jackson county while state police reported some flooded homes. Golf ball size hail was noted with widespread flooding in the community of Reddington and in central and southern Decatur county. Farmers said the damage caused by the foot of standing water in their fields will depend on how long it takes to dry out. Roads in these counties were closed after the storms until the water receded.

To the northwest 4.2 inches of rain was measured in Greenwood. A rollover vehicle crash occurred near the Greenwood exit on I-65 as a car hydroplaned on several inches of standing water. Power lines fell across I-65 in Johnson county, closing that interstate highway for several hours.

Deputies, firefighters, conservation officers, Red Cross workers and other volunteers assisted residents with downed trees and high water in Brown county. Strong winds destroyed or damaged some homes. A National Weather Service survey team later found that widespread straight-line wind damage occurred over northern Brown county, downing hundreds of trees. Some of the most

severe damage occurred east of Bean Blossom and west of Fruitdale. The damage pattern indicated winds exceeded 60 mph over a large portion of northern Brown county.

Wind gusts were problematic in central Indiana areas as well. A semitrailer was blown over on I-65 at State Road 28 in Clinton county and multiple trees were downed in Frankfort. Reports of gusts up to 70 mph in Morgan, Tippecanoe and Monroe counties were noted as well as gusts of 67 mph in Marion county and 55 mph in Hamilton county. Wind gusts of more than 60 mph were reported west of Monrovia and in Indianapolis. Storm damage in and around the town of Eminence in western Morgan county was investigated by a National Weather Service storm survey team. The team found this damage was due to straight-line winds in excess of 60 mph. The damage in Eminence was indicative of a downburst on the west edge of the town that then spread east across the town and to the east of Eminence.

Damage due to fires was reported in central Indiana. A transformer caught fire in one Noblesville neighborhood and it crashed to the ground in an explosion like fireworks. In Brownsburg, a lightning strike caused a fire that destroyed the roof of a home. About a dozen Hendricks county homes were struck by lightning Tuesday,

High winds in storms caused widespread power outages throughout Indiana. More than 100,000 customers of Duke Energy in central and southern Indiana lost power, including more than 12,000 in the Bloomington area and 16,000 in Vigo, Clay and Vermillion counties in western Indiana. About 45,000 customers of Indianapolis Power and Light were affected by power outages. Power was restored to two-thirds of these customers by evening.

More than 5,000 customers in Clark and Harrison counties in southern Indiana were without power while at least 7,000 residents in Clay county lost power due to the wind damage. In Parke county 3,800 customers in the area lost power and an additional 1,000 lost power because of trees and power lines blown down by the high winds. Thousands of people were still without power in central and southern Indiana Tuesday evening after the two rounds of severe thunderstorms pounded the state.

Golf ball size hail was noted in Henry, Jackson and Owen counties. Quarter-sized hail was reported in Lawrence county, with dime-sized hail reported in Montgomery county in Crawfordsville.

### **August 11<sup>th</sup> – 17<sup>th</sup>**

A weak low pressure trough in the upper atmosphere aided the passage of a surface cold front through Indiana at the start of this week. This cold front was not like the strong July variety. Temperatures fell to near normal for a few days until August 14<sup>th</sup>. A high pressure center behind the cold front slid quickly eastward to the Atlantic coast. Now in the back side return wind flow of this high pressure system, Indiana temperatures warmed a few degrees more each day, ending the week 5F degrees above the normal for mid-August. This new warm air mass packed lots of humidity. An advancing cold front, much stronger than the last, triggered intense downpours in northeast Indiana at the close of this week.

Rainfall began the week on the light side. Just a few tenths of an inch were scattered around the state the first couple days. Four dry days followed under the influence of the high pressure system behind the weak cold front. With humidity building in the warming air, showers in northern Indiana averaged up to an inch on August 16<sup>th</sup> while it remained dry in the south. Thunderstorms late the next day dumped torrential rains in northeast Indiana. National Weather Service employees measured 7 to 8 inches in Kosciusko county, including 7.83 inches at Leesburg. Other reports in the area exceeded 8 inches. Overall for the week rain totals were heaviest in the north with amounts averaging a half to one and a half inch. About 0.3 inch was common in central and southern parts of the state.

Over the past few weeks there has been a noted shortage of rain in northern Indiana with a surplus in the south. While southern Indiana residents were becoming frustrated with repeated bouts of intense rain and flooding, residents in the north started talk of impending drought. The intense rain of August 17<sup>th</sup> quickly silenced this discussion. While immediate localized flooding did occur it was generally brief and quickly soaked into dry soils or disappeared as runoff. Soils in northern Indiana had been extremely dry and rivers and streams were at low flow rates. The initial 3 to 4 inches of intense rain filled these low water areas, returning them to normal levels. Standing water in many areas the morning of August 18<sup>th</sup> were gone by early afternoon. Some counties in east central Indiana did not benefit from these rains and dryness remains in this area.

### **August 18<sup>th</sup> – 24<sup>th</sup>**

The cold front which caused the heavy rains in northern Indiana stalled after it passed through the state. Temperatures changed little and remained at 3F degrees above normal. Another cold front approached Indiana from the west as part of a stronger low pressure system over Wisconsin. As this front crossed the state another round of severe weather pummeled northwest Indiana on August 20<sup>th</sup>. The cold was more intense behind this second front as temperatures dropped to 9F degrees below normal by August 22<sup>nd</sup>. The high pressure ridge behind this cold front continued to transport cool Canadian air into Indiana as the week closed at 7F degrees below normal. Mid-August maximum temperatures normally range from about 80 to 90 degrees north to south across Indiana while minimums typically range from about 60 to 67 statewide.

Rainfall was frequent this week with cold fronts nearby. Total amounts for the week averaged 1.5 inch above normal in northern Indiana, up to one inch above normal in central, and a quarter inch below normal in southern Indiana. Typical amounts for a mid-August week total about 0.7 inch. Rainfall was light statewide on August 18<sup>th</sup> then increased the next day, averaging 0.8 inch in central Indiana. Precipitation continued the next two days, averaging a quarter inch in the north and about 0.15 inch elsewhere each day. As the high pressure took hold a few hundredths inch of rain fell in northern Indiana with dry weather in central and southern parts of the state.

An EF2 tornado with winds estimated at 120 mph ripped through Chesterton in Porter county on the evening of August 20<sup>th</sup>, leaving a 2.5 mile long and 60 yard wide path of snapped trees, downed power lines, and 211 damaged structures. Eight of these buildings were totally destroyed, 54 had major damage, and 149 had minor damage. The total damage did not exceed the minimum \$8 million required to be considered a disaster area eligible for federal relief funds but may qualify for Small Business Association loans.

An 8-unit apartment complex was totally destroyed, while roofs were taken off and windows broken near downtown. Most of the recently upgraded gymnasium roof was blown off and windows broken at the Westchester Middle School. Roof replacement is estimated to cost a half million dollars. General cleanup is expected to take weeks and cost the town about \$40,000. No significant injuries were reported. In nearby northern Lake county a severe thunderstorm caused some flooding.

About 9000 customers lost power in these storms due to downed lines and trees but power was restored to all but 400 homes by the end of the next day.

**August 25<sup>th</sup> – 31<sup>st</sup>**

The final week of August began cool and ended much colder, reminiscent of the cool weather pattern throughout July. At the start of the week a high pressure system was east of Indiana, moderating temperatures a bit to 4F degrees below normal in southerly winds. Temperatures did not change much the next four days as a new cold front slowed then stalled in the Indianapolis area. Then a large strong high pressure system from Canada muscled two cold fronts through Indiana on August 28<sup>th</sup>, dropping temperatures well below normal maximums in the low to mid 80s and minimums in the upper 50s and low 60s. The high pressure system broadened outward to cover much of the country, bringing clear pleasant autumn like temperatures to Indiana at the close of the month. For the week statewide temperatures averaged 6F degrees below late August normals.

Mid-week rain was sandwiched by dry weather at the start and end of the period. Northern Indiana received a few tenths inch of rain on August 26<sup>th</sup> while central and southern parts remained dry. The rain spread statewide the next day with a half to one inch in the north, a few tenths in central, and sprinkles in the south. On average a quarter to half inch of rain fell on August 28<sup>th</sup> as the strong cold front advanced through the state. The week ended as it began with dry conditions statewide. Overall rainfall for the week trended heavier northward through Indiana, with totals ranging from about a quarter inch in the south to 1.5 inch across northern Indiana.

**August Summary**

**Temperature**

<b>Region</b>	<b>Temperature</b>	<b>Normal</b>	<b>Deviation</b>
Northwest	69.4	71.6	-2.2
North Central	69.5	71.0	-1.5
Northeast	69.6	70.6	-1.0
West Central	70.6	72.8	-2.2
Central	70.4	72.2	-1.8
East Central	70.0	71.4	-1.4
Southwest	73.5	75.2	-1.7
South Central	72.3	74.5	-2.2
Southeast	72.0	73.8	-1.8
<b>State</b>	<b>70.9</b>	<b>72.7</b>	<b>-1.8</b>

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	4.16	3.81	0.35	109
North Central	5.07	3.83	1.24	133
Northeast	4.46	3.68	0.78	121
West Central	4.20	3.96	0.24	106
Central	3.94	3.75	0.19	105
East Central	2.99	3.55	-0.56	84
Southwest	2.39	3.67	-1.28	65
South Central	3.15	3.91	-0.76	80
Southeast	3.49	3.90	-0.41	90
<b>State</b>	<b>3.77</b>	<b>3.79</b>	<b>-0.02</b>	<b>99</b>

### Summer to date

#### Temperature

Region	Temperature	Normal	Deviation
Northwest	69.2	71.8	-2.5
North Central	68.9	71.3	-2.3
Northeast	68.9	70.9	-1.9
West Central	70.8	73.0	-2.2
Central	70.3	72.4	-2.1
East Central	69.9	71.6	-1.7
Southwest	73.7	75.2	-1.5
South Central	72.2	74.4	-2.2
Southeast	71.7	73.6	-2.0
<b>State</b>	<b>70.7</b>	<b>72.8</b>	<b>-2.1</b>

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	11.50	12.01	-0.51	96
North Central	12.03	11.93	0.10	101
Northeast	11.31	11.42	-0.11	99
West Central	13.89	12.68	1.20	109
Central	13.56	12.11	1.45	112
East Central	11.24	11.88	-0.64	95
Southwest	13.40	12.04	1.36	111
South Central	14.90	12.32	2.58	121
Southeast	15.85	12.23	3.61	130
<b>State</b>	<b>13.11</b>	<b>12.08</b>	<b>1.02</b>	<b>108</b>

## Annual-to-date

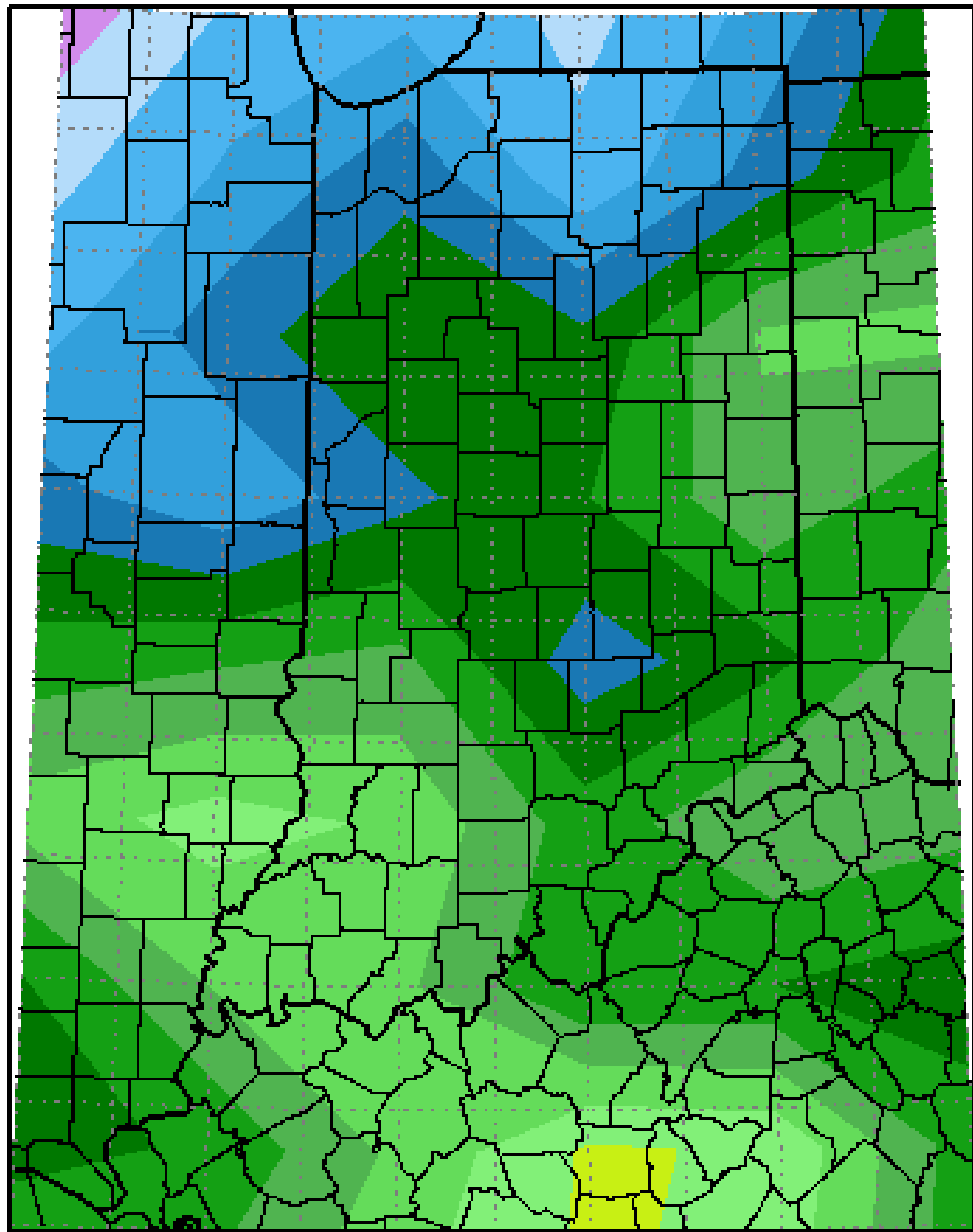
### Temperature

Region	Temperature	Normal	Deviation
Northwest	50.7	52.1	-1.4
North Central	50.4	51.6	-1.2
Northeast	50.4	51.2	-0.9
West Central	53.0	53.8	-0.8
Central	52.7	53.3	-0.7
East Central	52.1	52.5	-0.4
Southwest	56.6	57.0	-0.4
South Central	55.3	56.4	-1.1
Southeast	54.8	55.6	-0.8
<b>State</b>	<b>53.0</b>	<b>53.8</b>	<b>-0.8</b>

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	30.62	26.06	4.55	117
North Central	31.00	26.00	5.00	119
Northeast	30.05	25.15	4.91	120
West Central	34.20	28.74	5.47	119
Central	32.45	28.31	4.14	115
East Central	25.89	27.48	-1.59	94
Southwest	35.31	31.58	3.73	112
South Central	36.22	31.93	4.29	113
Southeast	33.64	31.05	2.59	108
<b>State</b>	<b>32.48</b>	<b>28.54</b>	<b>3.94</b>	<b>114</b>

# Total Precipitation in Inches August 1, 2009 to August 31, 2009



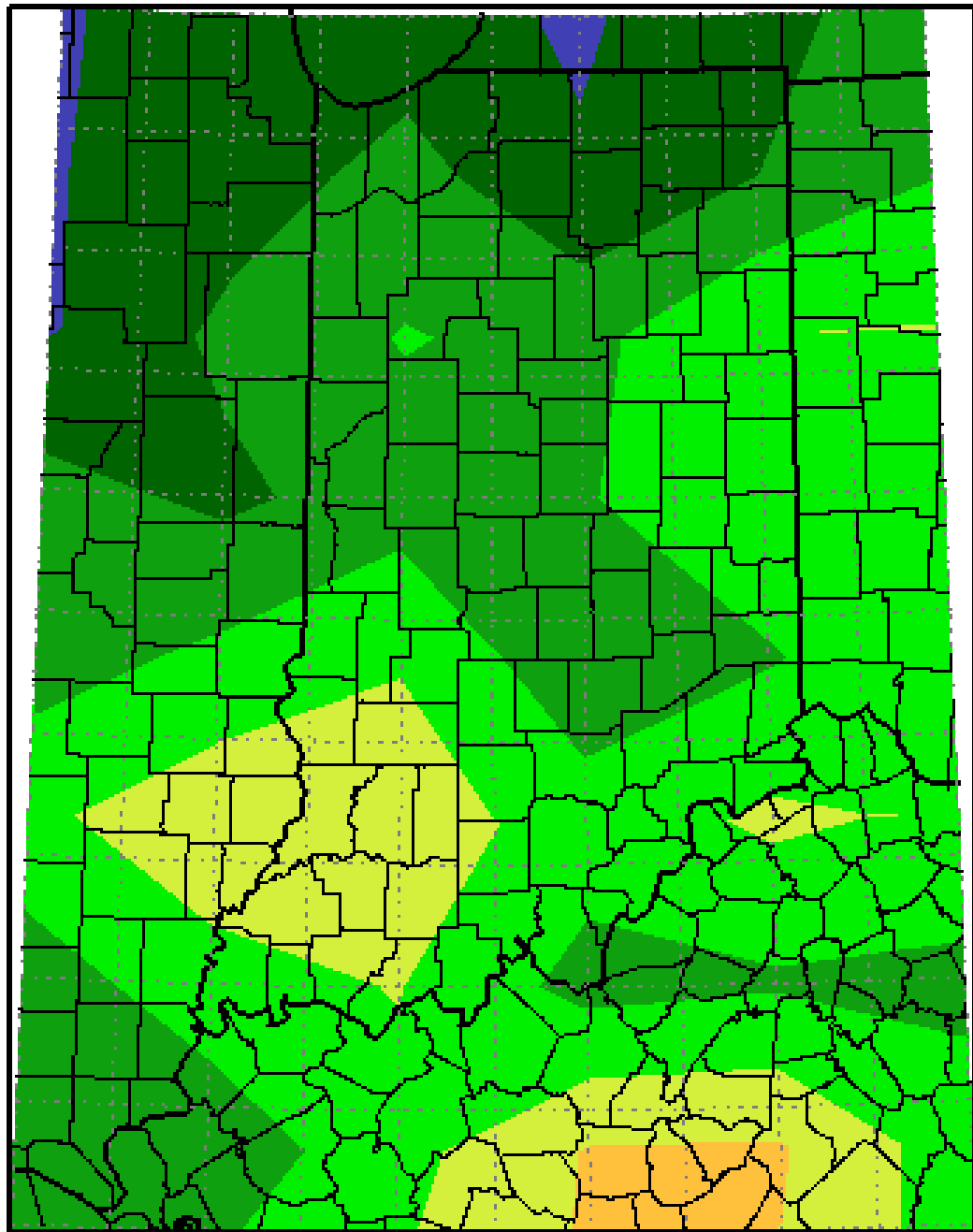
NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois



# Total Precipitation Percent of Mean August 1, 2009 to August 31, 2009

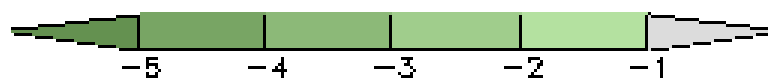
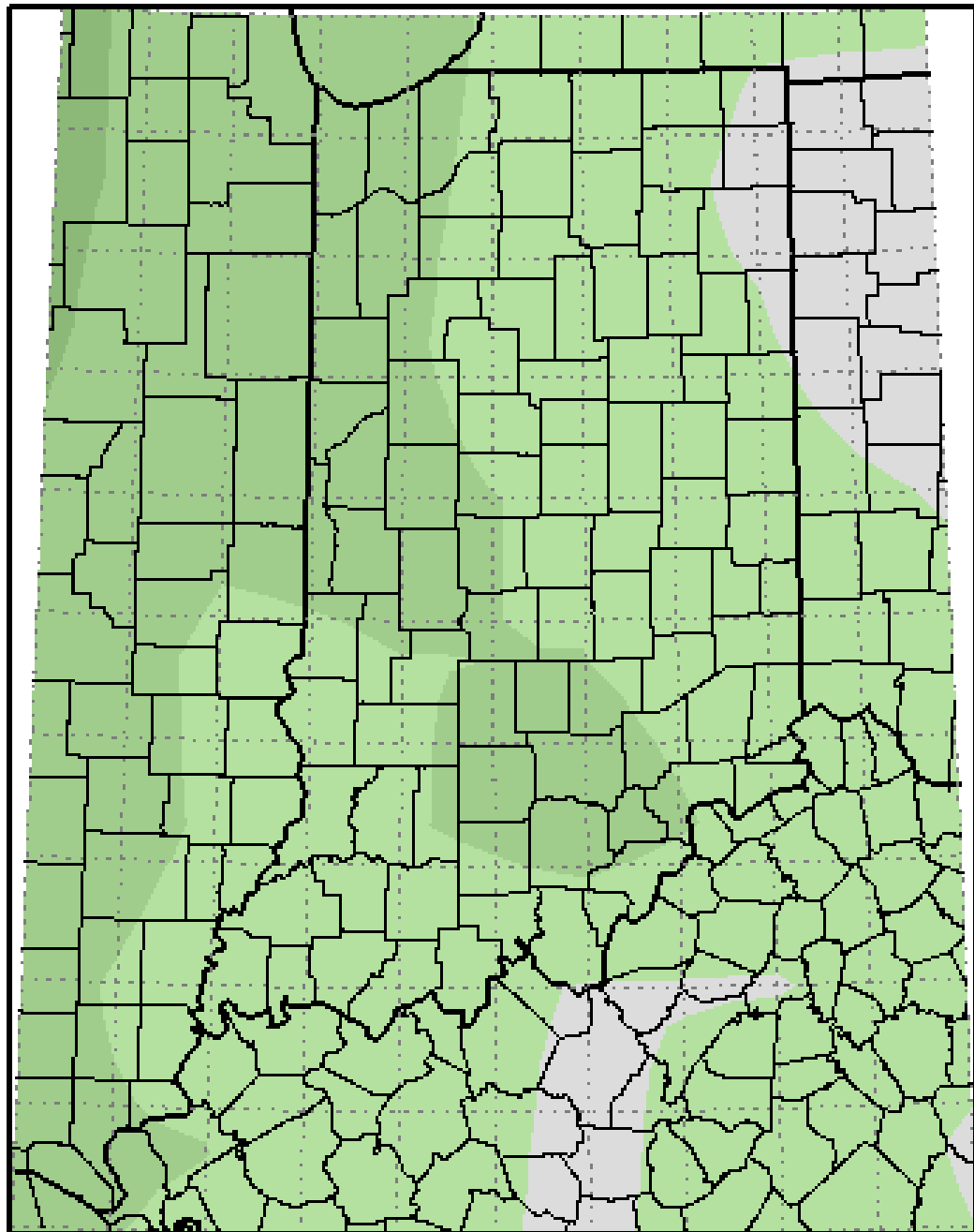


NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

**Average Temperature Departure from Mean in Degrees F  
August 1, 2009 to August 31, 2009**



**NOAA Midwestern Regional Climate Center  
Illinois State Water Survey  
Champaign, Illinois**

## *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, August 11<sup>th</sup> has 93.5% of Indiana under no drought, and 6.5% of Indiana under at *least* D0 through D4 drought status. This is followed by 0.00% as D1 through D4 status. To obtain the amount that is D0 status, simply subtract the D1-D4 column from the D0-D4 column, thus giving you the percentage of area with abnormally dry conditions. 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:

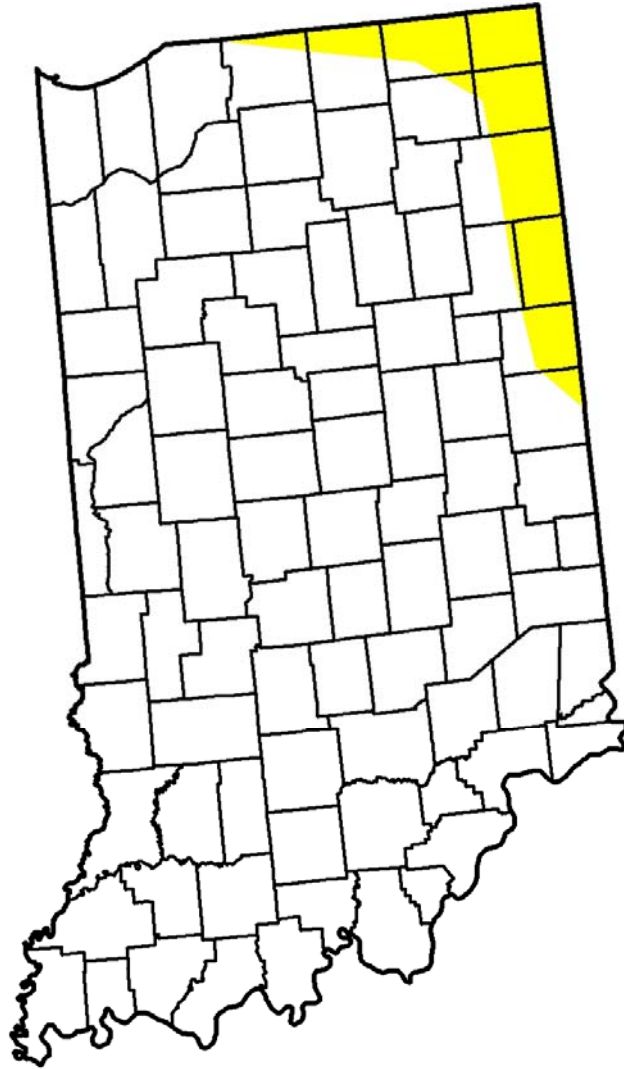


Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
09/01/09	100.00	0.00	0.00	0.00	0.00	0.00
08/25/09	100.00	0.00	0.00	0.00	0.00	0.00
08/18/09	98.10	1.90	0.00	0.00	0.00	0.00
08/11/09	93.52	6.48	0.00	0.00	0.00	0.00
08/04/09	93.52	6.48	0.00	0.00	0.00	0.00

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



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



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



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



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

