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## Indiana State Climate Office

### Monthly Weather Report



<http://www.iclimat.org>



Aug 4, 2010

## July 2010 Climate Summary

### Summary

The warm summer of 2010 continues. Daily state average temperatures were above normal on all but seven July days, nearly matching last month's low count of four cool days. State average precipitation was normal, despite another stormy month. High pressure sprawled across much of the country to our south persisted throughout July, transporting warm and humid air into Indiana. Often this air mass clashed with cooler and drier air from Canada, setting the stage for several severe weather events across our state the second half of this month.

The statewide average July temperature was 76.7° which is 2.0° above normal. While less extreme than June, this still ranks July 2010 as the 20<sup>th</sup> warmest July on record in Indiana in the past 115 years. July hasn't been this warm in Indiana since 2002, when the state average temperature was 77.0°, ranked at 13<sup>th</sup> place. The next most recent warmer July recorded an average temperature of 77.7° in 1999, good for 10<sup>th</sup> place in the rankings. But none of these years comes close to the sizzling 80.9° average which occurred during the Dust Bowl year of 1936.

July precipitation was slightly above normal in the western third of Indiana and in the north central region, but a little below normal elsewhere across the state. But there were towns and cities where thunderstorms on multiple days kept rain gages busy. A CoCoRaHS observer in Merrillville accumulated 9.99 inches in July, the highest precipitation total of the month reported in Indiana. In southwest Indiana, Jasper was not far behind with a July total of 9.92 inches. The CoCoRaHS volunteer in Birdseye noted 9.00 inches in July. Overall the state average precipitation for the month was 4.07 inches, which is very close to the July normal of 4.10 inches. This places July precipitation near the middle of the rankings at 46<sup>th</sup> wettest on record. Two years ago July was slightly wetter with an average 4.23 inches as the 40<sup>th</sup> wettest July. A year ago 4.39 inches fell on average, coming in at 35<sup>th</sup> wettest in 115 years of record. Some may remember the wettest July on record when a state average 8.65 inches fell in 1992.

After a stormy June it was quiet the first dozen days of July. Then the pace of severe weather picked up again, occurring almost daily to the end of the month. Areas of damage transitioned north and south across Indiana following the movements of warm and cold fronts. Small hail with numerous reports of trees and power lines down were very common this month. On July 20<sup>th</sup>, an EF0 tornado touched down near Trafalgar in Johnson county causing damage to roofs, trees, and power lines in this area. Just two days later another EF0 tornado hit Johnson county again, causing more damage to rooftops, flattening some crops, and taking down still more trees and power lines.

## **July 1<sup>st</sup> – 10<sup>th</sup>**

Early July featured a much different weather pattern than had persisted throughout nearly all of June. July opened with state average temperatures 7° below normal with no rain! A strong high pressure center pushed southward from Canada and sprawled across the east half of the country on July 2<sup>nd</sup>. As this system migrated eastward Indiana temperatures rose steadily through the week. The cool spell ended by Independence Day. State average temperatures rebounded to 6° above normal on July 7<sup>th</sup> as the warm backflow of the high pressure system intensified. This system finally broke down the next day, allowing the first of two cold fronts to pass through our state. The new warm spell had lasted less than a week. The second cold front on July 10<sup>th</sup> reinforced the cooler air over Indiana and dropped temperatures back to normal at the close of the ten day interval. For July so far this places state average temperatures at 1° above normal. Typically for early July daily maximum temperatures should range from 86° to 91° north to south across Indiana. Daily minimums normally vary between 64° in the far north to 70° in the southwest.

Dry weather to start July was a welcome break for storm weary Hoosiers. Rainfall was very light across Indiana until about a half inch was widely reported on the morning of July 9<sup>th</sup>. This late week rain arrived with the passage of the two cold fronts. Total rainfall for the ten day interval averaged about 0.9 inch in northern Indiana and 0.7 inch in central and southern sections. These amounts are 80 percent of normal in the north and only half of normal in central and southern Indiana. Normally in the first week of July about 1.1 inch is expected in northern Indiana, around 1.3 inch in central, and 1.4 inch across the south. There were some locally heavy showers in southern Indiana. The highest daily rainfall amount was 3.32 inches reported by the CoCoRaHS observer at Chrisney in Spencer county. This location also noted the greatest total rainfall for the ten days at 3.93 inches while Jasper in Dubois county recorded 3.26 inches.

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

It was too good to last! The welcome break last week from the warm temperatures and wet weather ended abruptly this week. Temperatures rebounded on July 11<sup>th</sup> and clung to the warm side of normal all week long. State average temperatures the first four days of the week held steady at 1° to 2° above normal. A weak cold front passed through the state on July 13<sup>th</sup> but was barely noticed, only delaying an imminent return to the heat by holding temperatures steady. A new push of warm and humid air on July 15<sup>th</sup> into Indiana bounced temperatures a bit back into the now familiar level of 4° and 5° above normal for the rest of the week. A second cold front swept across the state on July 16<sup>th</sup> but again had little to no impact on temperatures. At this time of year daily maximum temperatures should vary from 87° in far northern Indiana to 92° in the far southwest. Daily minimums should range between 66° and 71° north to south across the state.

The passage of frontal systems this week was more apparent in the rain that fell than in temperature changes. Reminiscent of June, rain fell every day this week somewhere within the state. At first view daily amounts would appear light to moderate, generally under a third of an inch. This translates into weekly totals of near 0.7 inch in northern Indiana and 1.1 inch in central and southern sections. But isolated amounts were heavy this week in parts of east central and far south central Indiana. The CoCoRaHS observer in Birdseye measured 3.07 inches of rain on the morning of July 16<sup>th</sup> and 6.67 inches for the week, the heaviest reported amounts in Indiana. Lebanon noted 3.48

inches and Jasper 3.35 inch totals this week. Typically in Indiana rainfall totals this week of July should range from 0.8 inch in northern Indiana to 0.9 inch in central and southern areas of the state.

One of the east central cities impacted by heavy rain in thunderstorms was New Castle. A thunderstorm that was parked over the city for more than an hour resulted in flooded neighborhoods on July 13<sup>th</sup> after several inches of rain. Workers sand bagged homes that were most affected by the rising flood waters.

Trees and power lines came down in several northern Indiana towns on July 15<sup>th</sup>, including Boswell, Logansport, Rainsville, Claypool, New Waverly, Churubusco, and Lyons. The next day trees and power lines also came down in French Lick.

Damage due to hail and fallen trees was widespread on July 17<sup>th</sup>. In White county nickel size hail was reported in Buffalo with a few hailstones exceeding 1.5 inch in diameter. Golf ball size hail was observed at Cedar Point. Trees fell on power lines in 60 mph gusts during thunderstorms that day closing several roads in White and Tippecanoe counties. There was extensive damage to very old trees along the Wabash River. By early Sunday nearly 2100 people were without electricity. Lightning struck a home in Battle Ground and set it on fire. Meanwhile in southern Indiana a Scottsburg observer reported quarter size hail at his location. In Abydel in Orange county a barn was destroyed while a roof was blown off a house at Coal City in Owen county.

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

A frontal system meandered north and south across Indiana all week, sometimes as a cold and sometimes as a warm front, as a series of low pressure systems brought an extended period of unsettled weather to our state. A strong warm upper atmospheric high pressure system across the southern half of the country sprawling coast to coast battled cooler air over Canada with Indiana caught in the middle. The humid warm air mass eventually won out as evidenced by daily temperatures which climbed well above normal by week's end. State average temperatures the first half of this week held at 2° above normal except for one normal day after a cold front passed through. Then starting July 21<sup>st</sup> temperatures rose steadily 2° per day reaching 8° above normal by the end of the week. For the week state average temperatures netted 4° above normal. Annual temperatures in Indiana normally peak this week of the year, lagging the longest day length by one month. Daily maximum temperatures normally range from 87° in far northern Indiana to 93° in the southwest. Typically daily minimums vary between 67° and 72° north to south across our state.

With fronts constantly in the area rain fell over Indiana every day this week. The heavier amounts fell in midweek in southern Indiana and at the end of the week in northern counties. The highest daily amount reported in Indiana was 5.56 inches by a CoCoRaHS observer in Michigan City on the morning of July 24<sup>th</sup>. That same day the Rensselaer station reported 5.50 inches. A CoCoRaHS volunteer at Spencer noted the highest weekly total rainfall in the state at 6.41 inches. On average one inch of rain fell in northern Indiana this week, 1.2 inch in central, and 1.8 inches across the south. Normally this week in July about 1.1 inch of rain falls in northern and central Indiana with one inch in southern Indiana.

Severe weather occurred every day this week except July 21<sup>st</sup> somewhere in Indiana. The saga began in northern Indiana on July 18<sup>th</sup>. Pea size hail and torrential rains were reported at South Bend while trees and power lines came down in Laporte. Several thousand customers lost power in Laporte and Michigan City. To the south trees came down in Grovertown in Starke county while large branches fell in Kosciusko county, closing some local roads. Wind gusts measured at 60 mph in Huntington brought trees and power lines down there as well.

The action moved to southern Indiana the next day. Winds in excess of 70 mph took down telephone poles in Terre Haute. Power lines were brought down by falling trees in numerous towns and cities, including Coalmont, Vincennes, Owensville, Fort Branch, Loogootee, Oakland City, Linton, Spencer, Poseyville, Evansville, Jasper, English, and Carefree. Local roads were closed for a time due to the fallen trees in some of these locations. In New Albany a tree fell on a car.

It was central Indiana's turn the next day on July 20<sup>th</sup>. A confirmed weak EF0 tornado struck 3 miles southeast of Trafalgar in Johnson county that evening. A damage survey found the tin roof from a shed embedded into the ground. Several trees were snapped or uprooted. Elsewhere high winds toppled trees and telephone poles which punched holes into a Terre Haute building. In Linton and Loogootee storm winds took down still more trees and power lines.

With only one day of rest the storm fury resumed on July 22<sup>nd</sup>. Once again a weak EF0 tornado touched down in Johnson county, this time in the afternoon on the southwest side of Greenwood. The roofs of some sheds were damaged, small areas of crops were flattened, and tree limbs came down. The National Weather Service also rated this tornado as a land spout as it formed near the merger of thunderstorm winds and outflow boundaries.

On July 23<sup>rd</sup> the severe weather moved to northern Indiana along with the final warm front of the week. Large trees and limbs were brought down in Gary. The next day heavy thunderstorms and wind combined to yield even more tree damage. Trees fell all across the northern half of Laporte county in 60 mph wind gusts with isolated damage in neighboring Porter county. More tree damage was noted in Bass Lake, Wheatfield, and Peru. In Winamac standing water was also a problem on county roads. To the southwest a barn was damaged in Earl Park in Benton county.

### **July 25<sup>th</sup> – 31<sup>st</sup>**

Once again this week Indiana and neighboring states sat on the edge of a weather battleground. A massive hot and humid air mass parked over southern states for much of this summer remained the target of cool Canadian air attempting a move south. The long east to west line between these distinct air masses is the frontal boundary, marked by a cross country line of thunderstorms, some severe, dubbed by meteorologists as the "ring of fire". This week was somewhat quieter than last, as only two cold fronts and one warm front traversed Indiana, resulting in only one severe weather day.

The first cold front of the week crossed Indiana on July 25<sup>th</sup>. Temperatures began the week at 4° above normal, cooling only slightly to 1° above normal behind the front the next day. As surface high pressure moved east of Indiana and a stormy warm front pushed northward, temperatures inched upward to 5° above normal on July 28<sup>th</sup>. A second stronger cold front reclaimed Indiana

over the next two days, dragging temperatures down to 1° below normal the final two days of the week. Overall for the week state average temperatures stood at 2° above normal, a tad cooler than a week ago. Normally for the final week of July daily maximum temperatures would range from 85° in far northern Indiana to 91° in the far southwest. Daily minimums should vary between 65° and 70° north to south across the state. The normal peak of annual temperatures has now passed as weekly normals will now decrease to the end of the year.

Rainfall and severe weather events slowed down from a week ago. A half to an inch of rain reported on July 25<sup>th</sup> was followed by two nearly dry days. About a third of an inch fell during severe weather on July 28<sup>th</sup>. Less than 0.2 inch fell at the close of the week. Totals for the week averaged about 1.4 inch in northern Indiana, 0.9 inch in central, and a half inch across southern Indiana. Typically this week about 0.8 inch is expected in northern Indiana and 0.9 inch in central and southern parts of the state. The heaviest daily amount was 5.50 inches recorded by a CoCoRaHS observer in Rensselaer on June 25<sup>th</sup>. A Merrillville observer noted the largest total for the week at 7.36 inches, while another reporter in that city recorded 5.02 inches. The Rensselaer total was 5.56 inches for the final week of July.

Much of the severe weather action was in northern Indiana counties this week. Fallen trees, some on power lines, was by far the most common damage reported on July 28<sup>th</sup>. Affected towns included Howe, Topeka, Goshen, Koontz Lake, Kendallville, Spencerville, Culver, Huntington, New Haven, Warsaw, Frankfort, Wabash, and Marion. Winds of 50 to 60 mph were reported in thunderstorms. In Howe a baseball dugout was destroyed while a tree fell on a trailer in Allen county.

## July Summary

| Region        | Temperature | Temperature |            |
|---------------|-------------|-------------|------------|
|               |             | Normal      | Deviation  |
| Northwest     | 75.8        | 73.6        | 2.1        |
| North Central | 75.2        | 73.1        | 2.0        |
| Northeast     | 75.4        | 72.8        | 2.6        |
| West Central  | 76.4        | 74.8        | 1.5        |
| Central       | 76.1        | 74.3        | 1.8        |
| East Central  | 75.7        | 73.5        | 2.2        |
| Southwest     | 79.3        | 77.1        | 2.2        |
| South Central | 78.4        | 76.3        | 2.1        |
| Southeast     | 77.8        | 75.5        | 2.3        |
| <b>State</b>  | <b>76.7</b> | <b>74.6</b> | <b>2.1</b> |

| Region        | Precipitation |             |              |                   |
|---------------|---------------|-------------|--------------|-------------------|
|               | Precipitation | Normal      | Deviation    | Percent of Normal |
| Northwest     | 4.59          | 3.86        | 0.73         | 119               |
| North Central | 4.27          | 3.80        | 0.47         | 112               |
| Northeast     | 3.16          | 3.66        | -0.50        | 86                |
| West Central  | 4.84          | 4.39        | 0.46         | 110               |
| Central       | 3.70          | 4.26        | -0.56        | 87                |
| East Central  | 3.32          | 4.10        | -0.78        | 81                |
| Southwest     | 5.19          | 4.26        | 0.93         | 122               |
| South Central | 3.86          | 4.32        | -0.46        | 89                |
| Southeast     | 3.20          | 4.12        | -0.92        | 78                |
| <b>State</b>  | <b>4.10</b>   | <b>4.10</b> | <b>-0.01</b> | <b>100</b>        |

### Summer to date (June - July)

| Region        | Temperature |             |            |
|---------------|-------------|-------------|------------|
|               | Temperature | Normal      | Deviation  |
| Northwest     | 74.0        | 71.9        | 2.2        |
| North Central | 73.4        | 71.3        | 2.1        |
| Northeast     | 73.5        | 71.0        | 2.6        |
| West Central  | 75.4        | 73.1        | 2.3        |
| Central       | 75.0        | 72.5        | 2.5        |
| East Central  | 74.5        | 71.7        | 2.8        |
| Southwest     | 78.6        | 75.2        | 3.3        |
| South Central | 77.6        | 74.4        | 3.2        |
| Southeast     | 76.7        | 73.5        | 3.1        |
| <b>State</b>  | <b>75.5</b> | <b>72.8</b> | <b>2.7</b> |

| Region        | Precipitation |             |             |                   |
|---------------|---------------|-------------|-------------|-------------------|
|               | Precipitation | Normal      | Deviation   | Percent of Normal |
| Northwest     | 12.43         | 8.20        | 4.23        | 152               |
| North Central | 11.25         | 8.10        | 3.15        | 139               |
| Northeast     | 9.46          | 7.74        | 1.72        | 122               |
| West Central  | 13.51         | 8.72        | 4.79        | 155               |
| Central       | 14.14         | 8.36        | 5.78        | 169               |
| East Central  | 12.15         | 8.33        | 3.81        | 146               |
| Southwest     | 10.28         | 8.37        | 1.91        | 123               |
| South Central | 10.65         | 8.41        | 2.24        | 127               |
| Southeast     | 11.25         | 8.34        | 2.91        | 135               |
| <b>State</b>  | <b>11.82</b>  | <b>8.30</b> | <b>3.52</b> | <b>142</b>        |

## 2010 Annual to date

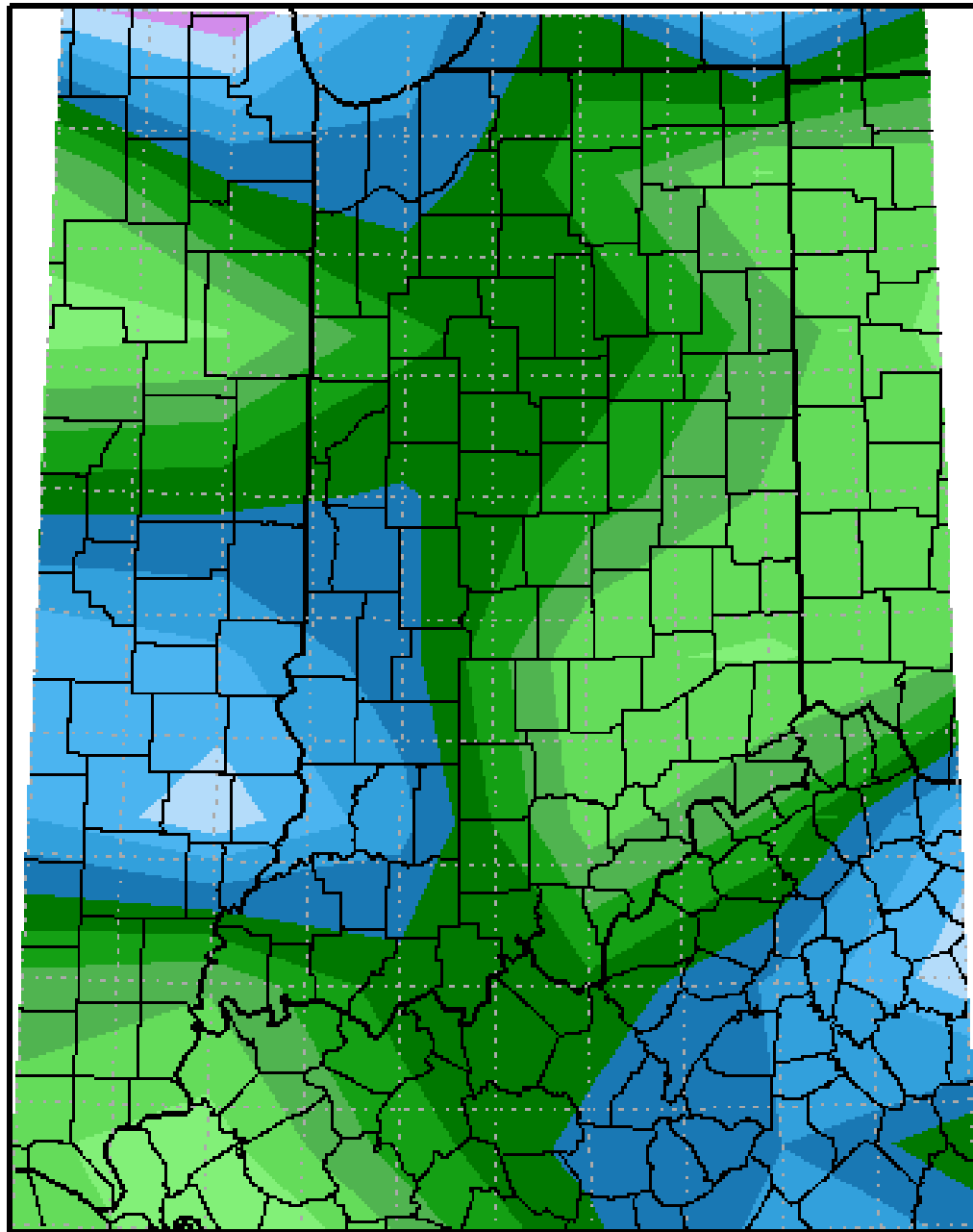
### Temperature

| Region        | Temperature | Normal      | Deviation  |
|---------------|-------------|-------------|------------|
| Northwest     | 50.8        | 49.2        | 1.6        |
| North Central | 50.7        | 48.8        | 1.9        |
| Northeast     | 50.6        | 48.4        | 2.2        |
| West Central  | 52.1        | 51.0        | 1.1        |
| Central       | 52.0        | 50.6        | 1.4        |
| East Central  | 51.4        | 49.7        | 1.7        |
| Southwest     | 55.5        | 54.4        | 1.1        |
| South Central | 54.6        | 53.8        | 0.7        |
| Southeast     | 53.9        | 52.9        | 1.0        |
| <b>State</b>  | <b>52.4</b> | <b>51.1</b> | <b>1.4</b> |

### Precipitation

| Region        | Precipitation | Normal       | Deviation   | Percent of Normal |
|---------------|---------------|--------------|-------------|-------------------|
| Northwest     | 25.90         | 22.25        | 3.65        | 116               |
| North Central | 24.83         | 22.17        | 2.66        | 112               |
| Northeast     | 23.84         | 21.46        | 2.38        | 111               |
| West Central  | 27.10         | 24.78        | 2.32        | 109               |
| Central       | 28.16         | 24.56        | 3.60        | 115               |
| East Central  | 26.23         | 23.93        | 2.30        | 110               |
| Southwest     | 27.41         | 27.91        | -0.50       | 98                |
| South Central | 27.87         | 28.02        | -0.15       | 99                |
| Southeast     | 27.43         | 27.15        | 0.27        | 101               |
| <b>State</b>  | <b>26.67</b>  | <b>24.75</b> | <b>1.91</b> | <b>108</b>        |

**Total Precipitation in Inches  
July 1, 2010 to July 31, 2010**



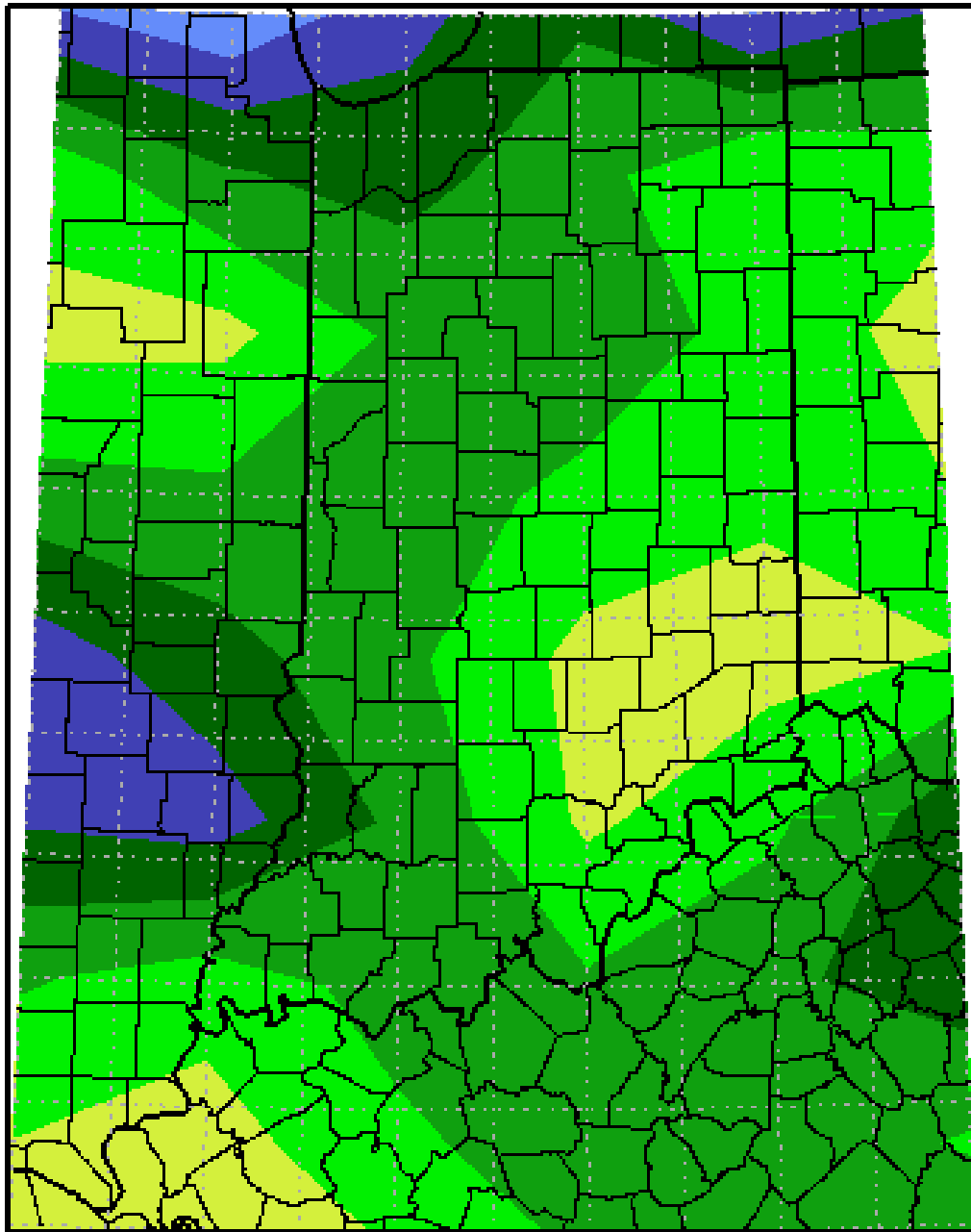
**NOAA Midwestern Regional Climate Center**

**Illinois State Water Survey**

**Champaign, Illinois**



**Total Precipitation Percent of Mean  
July 1, 2010 to July 31, 2010**

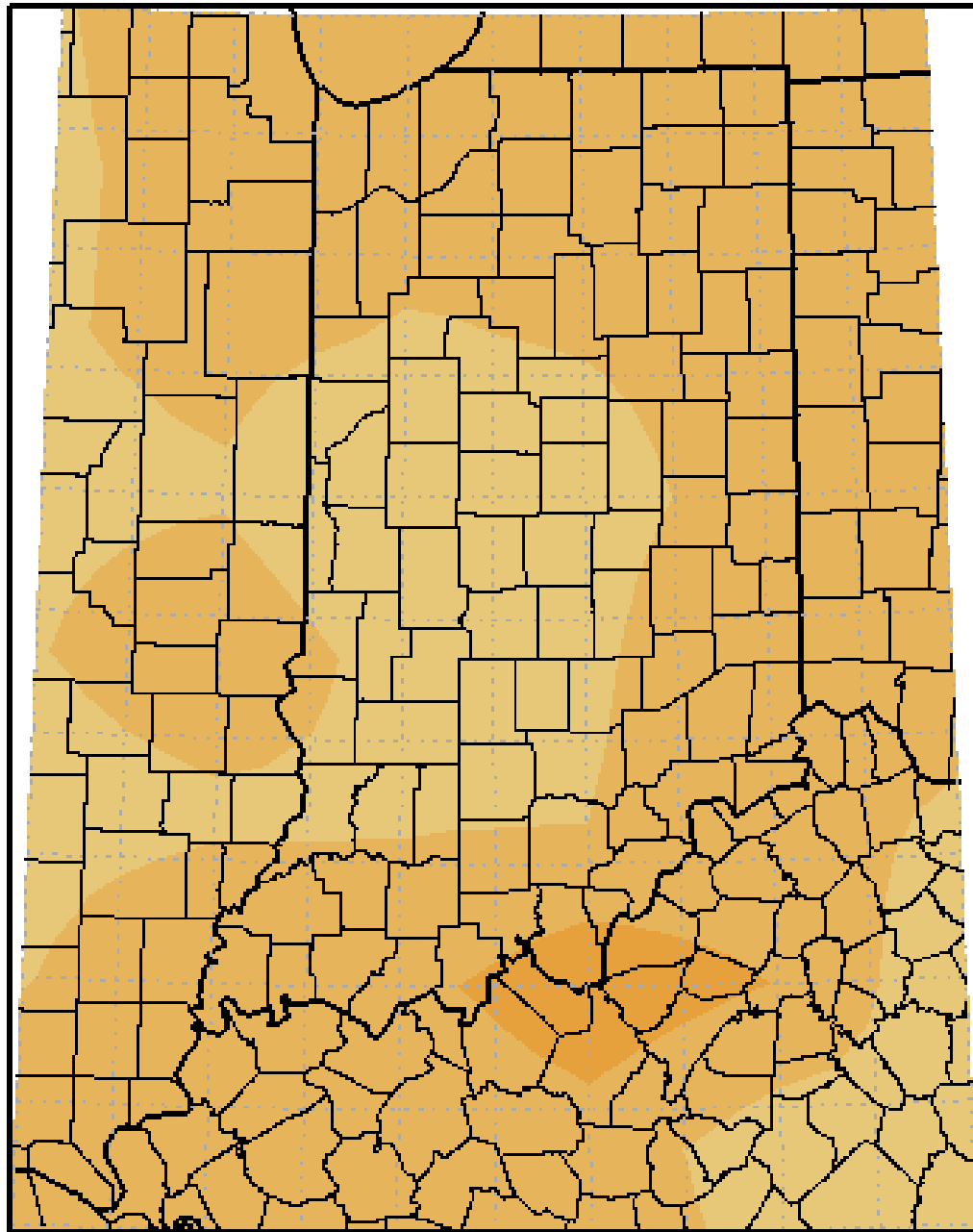


**NOAA Midwestern Regional Climate Center**

**Illinois State Water Survey**

**Champaign, Illinois**

**Average Temperature Departure from Mean in Degrees F  
July 1, 2010 to July 31, 2010**



**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, July 6<sup>th</sup> has 100.00% of Indiana under no drought, and 0.00% of Indiana under at least D0 through D4 drought status. This is followed by 0.0% 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 (0.00%). 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:

|  |  |
|--|--|
| <span style="display: inline-block; width: 10px; height: 10px; background-color: yellow; border: 1px solid black;"></span> D0 Abnormally Dry     | <span style="display: inline-block; width: 10px; height: 10px; background-color: red; border: 1px solid black;"></span> D3 Drought - Extreme       |
| <span style="display: inline-block; width: 10px; height: 10px; background-color: orange; border: 1px solid black;"></span> D1 Drought - Moderate | <span style="display: inline-block; width: 10px; height: 10px; background-color: brown; border: 1px solid black;"></span> D4 Drought - Exceptional |
| <span style="display: inline-block; width: 10px; height: 10px; background-color: beige; border: 1px solid black;"></span> D2 Drought - Severe    |  |

| Week     | None   | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4   |
|----------|--------|-------|-------|-------|-------|------|
| 07/27/10 | 100.00 | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| 07/20/10 | 100.00 | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| 07/13/10 | 100.00 | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |
| 07/06/10 | 100.00 | 0.00  | 0.00  | 0.00  | 0.00  | 0.00 |

*July 6<sup>th</sup> Drought Summary*



*July 13<sup>th</sup> Drought Summary*



*July 20<sup>th</sup> Drought Summary*



*July 27<sup>th</sup> Drought Summary*

