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## Indiana State Climate Office

### Monthly Weather Report

**Jul 6, 2009**



<http://www.iclimat.org>

## June 2009 Climate Summary

### Summary

Two very different weather patterns visited Indiana in June. The first half and the very end of the month featured more of the same old cool and wet conditions which have persisted most of the spring season in our state. Weather fronts stalled over Indiana, triggering frequent storminess with moderate rains. An abrupt shift to summer time heat and humidity occurred mid-month as a major change in the upper atmospheric jet stream path shut down cold air transport from Canada. The ten day heat wave ended as suddenly as it began. Unseasonably cold air plunged into Indiana the last few days of June to close out the month.

In the end it was heat and rain that dominated the month's weather. The state average June temperature of 72 degrees was one degree above the long term month normal. Precipitation averaged 4.9 inches statewide in June, which is 0.7 inch or nearly 20 percent higher than normal. This nudges June 2009 overall into the top one third warmest Junes on record in Indiana. The month also ranks near the top one fourth of wettest Junes in the 114 years of state averaged weather data.

### June 1<sup>st</sup> – 9<sup>th</sup>

As 2009 moves along we enter June, the sixth month of the year. Normally for the first week you'd expect temperatures in the mid to upper 70's depending on your location. On June 1<sup>st</sup> high temperatures across Indiana were in the mid to upper 80s, about 8F above normal. The approaching weather system would change all that. A strong cold front pushed south through Indiana and with it the temperatures dropped. Temperatures fell 15F-20F in a day in the northern half of the state. The south followed suit on the 3<sup>rd</sup> once the system worked its way through. Temperatures remained more than 5F below normal through June 5<sup>th</sup>. The 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> saw temperatures right around normal (mid to upper 70s). Then on the 9<sup>th</sup> a new cold front started to push through, again affecting temperatures to the north. The northwestern half of the state dropped as much as 10F below normal while the southeastern half rose about 3F above the normal. The first nine days of June 2009 experienced an average high temperature of about 76F, 2F below normal.

Seven of the first nine days of June were filled with rain, some of which were associated with severe storms, which arrived as the month began. Thunderstorms tore through northern Indiana on the 1<sup>st</sup>, producing high winds, hail and heavy rains. White, Carroll, Cass and Miami counties received the most rain during the day with totals close to 0.5 inch. Elsewhere isolated

thunderstorms produced limited precipitation. As the cold front pushed to the south the rest of the state was hit with rain and severe storms. On the second a wave of thunderstorms brought large hail and straight-line winds to central Indiana. The heaviest rains fell from Benton and Warren counties west to Adams and Jay counties. This horizontal swath received about 0.8 inches, with some local areas reporting over an inch of rain on the evening of the second. The thunderstorms in central Indiana were short lived but very damaging. The system stayed in Indiana on the 3<sup>rd</sup> with the heaviest rains now located in the southeast. Ohio, Switzerland and Jefferson counties all reported storm totals of over 0.65 inches for the 3<sup>rd</sup>. Elsewhere totals were modest at about a quarter of an inch for much of southern and central Indiana. This system just wouldn't leave; central and southern counties reported another 0.3 inches on the morning and afternoon on the 4<sup>th</sup>. Some residual moisture fell along the Indiana-Kentucky border on the 5<sup>th</sup>, when this system finally released Indiana from its grasp. Totals on the 5<sup>th</sup> were minimal. This began a short-lived dry period, where Indiana received no precipitation from the afternoon on the 5<sup>th</sup> through the 7<sup>th</sup>. A new cold front brought more moisture on the 8<sup>th</sup>, with light rain falling in central and northern Indiana. Storm totals were 0.1 inches or less. The system progressed across the state and brought light rain to all of Indiana on the 9<sup>th</sup> but once again rain totals were less than 0.1 inches. During the first nine days of June all of Indiana received 0.5 inches of rain, with a maximum of almost two inches in Carroll and Howard counties.

The severe storms that rolled through the state at the beginning of the month routinely caused high winds, hail and lightning. Though there was a place or two believed to be hit by a tornado, the Storm Prediction Center reports no tornadic activity in Indiana during the first week of June. It was believed that a tornado touched down in southern Clinton County on the evening of June 1<sup>st</sup>, downing trees and power lines. However this tornado was never confirmed. Flash flood warnings went into effect as more than an inch of rain fell in a short period of time. The following night, June 2<sup>nd</sup>, another batch of severe weather wreaked havoc across Indiana. Straight-line winds and hail were the major culprits this time. The hardest hit were Marion and Hamilton counties, where baseball-size hail fell in some locations. Winds dropped trees throughout central Indiana and hail tore up anything in its path, including car windshields, glass doors, siding and even some roofs. State Farm Insurance had received over 1,500 claims involving homes and 2,000 involving vehicles due to this storm as of June 5<sup>th</sup>.

### **June 10<sup>th</sup> – 16<sup>th</sup>**

For the first time in 2009 an entire week stabilized around the statewide temperature normal. All seven days of the week the statewide average high temperature was below normal for Indiana. This mini cold spell got kicked off at the tail end of June 9<sup>th</sup> thanks to a cold front passage. However, the system stayed with us as a stationary front on the 10<sup>th</sup> and 11<sup>th</sup> before leaving as a cold front on the 12<sup>th</sup>. Following behind were two more small cold fronts on the 13<sup>th</sup> and 15<sup>th</sup>. This sequence meant more below normal high temperatures. The high fluctuated between 2F and 7F below normal. Highs for the week were routinely in the mid 70s when they should be close to 80. To most people, mid 70s are nice. Meteorologically speaking, mid 70s are a bit cool for the second week in June. The actual statewide average high temperature for June 9<sup>th</sup> through 16<sup>th</sup> is 77F, approximately 4F below normal.

As expected with a stalled system and two more fronts passing in a week's time, it was another wet period for the state. Light rain fell periodically on the 9<sup>th</sup> as the cold front stalled and transitioned to the stationary front that would help produce more significant rainfall the next two days. Storms rolled across most of the state on the 10<sup>th</sup> but the most severely hit area was central Indiana. Vigo to Shelby counties were in the heavy rain zone, where daily totals reached upwards of half an inch. Elsewhere light showers failed to produce more than 0.10 inches of new rain. The system strengthened and began to morph into a cold front again on the 11<sup>th</sup>. Atmospheric patterns lead more rain to the region but this time the heavy rains were widespread. Almost the entire state reported an inch or more of rain on the 11<sup>th</sup>, while some counties reported totals of close to 1.5 inches. The rain finally left in the early afternoon on the 12<sup>th</sup> but not before dropping another 0.3 inches on top of the previous day's total. The reprieve was short as the next system entered on the 13<sup>th</sup>, though the rains were focused primarily in the north and were very weak. The system kicked it up a notch on the 14<sup>th</sup> as the state became engulfed in another round of rain. Fortunately totals rarely breached 0.1 inches. This system departed late on the 14<sup>th</sup> and by the next afternoon another one took its place. This disturbance swept along the Indiana-Kentucky border and dropped close to another 0.5 inches of rain there on the 15<sup>th</sup>. While the heaviest stuff was focused right at the border, light rain showers traveled as far north as Logansport. More of the state became soaked on the 16<sup>th</sup> as the system pushed its way north. Another 0.2 inches fell across central and southern Indiana while the north experienced some light drizzle off and on throughout the day. Over 2.5 inches of rain fell this past week in central Indiana, while the south wasn't too far behind. Dry conditions and clear skies were not seen for more than a few hours from June 9<sup>th</sup> through 16<sup>th</sup>.

Another week of daily rains meant the threat for flooding increased. Multiple times during the week flash flood warnings went into effect thanks to isolated heavy rains. General flood watches engulfed river areas around Indiana. While river levels rose, actual flood damage was minimal.

### **June 17<sup>th</sup> – 23<sup>rd</sup>**

A major shift occurred this week in the cool and wet weather pattern that has persisted much of this spring in Indiana. Cool Canadian air masses which have dominated our weather were shut off as jet stream winds have relocated, transporting much warmer air into Indiana from our southwest. Daily air temperatures which began near normal at the start of the period jumped to 4 degrees above normal on June 18 and have steadily climbed to 7 to 8 degrees above normal by June 23. A warm dome of hot air that had been building over the southwest states migrated eastward to Indiana in recent days, elevating maximum temperatures to near 90 and minimums to around 70. Summer has arrived!

The transition to the new weather pattern hasn't produced instant relief from the heavy rains. Weather fronts have stalled over Indiana this period in advance of the hot air dome. Rainfall totals for the seven days ranged from 1.3 inches in the north to 2.1 inches in parts of central Indiana. These amounts are nearly double the typical weekly rainfall in Indiana at this point in June. Most of this rain came early along with severe weather on June 18 and 19. Rains have decreased in recent days as the warm dry air dome takes hold.

Strong winds within thunderstorms on the morning of June 18 blew over a dozen empty train cars near Worthington. The lack of cargo allowed a quick cleanup with no major impacts other than the

curiosity of onlookers. The next evening a tornado ripped through Fulton county in northern Indiana, with funnel clouds sighted in west central Indiana in Vermillion and Fountain counties. Trees and power lines came down throughout this region west of Indianapolis. Other than the loss of power to 4700 customers in the Terre Haute area, no other significant damage was reported.

### **June 24<sup>th</sup> – 30<sup>th</sup>**

The hot air mass which blasted northeastward into Indiana on June 18 persisted into its second week. Afternoon temperatures which sizzled in the mid 90s dipped only to the low 70s at dawn, 7 to 8 degrees above late June normals. A gradual cool down began on June 26 as the hot dome of air retreated to the southwest and cooler air started to return behind a series of cold fronts. A refreshing breeze on June 28 signaled yet another pattern change in the jet stream with each day cooler than the one before. June closed with average temperatures falling more than 10 degrees for the week, ending the month with daily temperatures 5 degrees below normal and still falling.

Precipitation the final week of June was generally much lighter than normal, averaging nothing in some areas to 0.6 inch in other sections. At this time of year about an inch per week is typical. A strong cold front on June 26 brought flash flooding to Randolph county bordering Ohio where isolated 5 inch rain amounts were noted. In the Indiana suburbs of Louisville, more than 3 inches was reported in less than two hours. Located near the Indiana borders, these totals did not reflect the overall lack of significant rain in Indiana during the week.

Residents of one southern Indiana city seeking to escape the summer heat were disappointed. Construction of the Washington city pool is so far behind schedule it left swimmers high and dry. Workers for the construction company report they lost 24 work days this spring due to the persistently wet weather.

## **June Summary**

### **Temperature**

<b>Region</b>	<b>Temperature</b>	<b>Normal</b>	<b>Deviation</b>
Northwest	70.0	70.0	0.0
North Central	69.5	69.4	0.0
Northeast	69.3	69.1	0.2
West Central	72.4	71.3	1.0
Central	71.6	70.7	0.9
East Central	71.0	69.8	1.2
Southwest	75.6	73.3	2.3
South Central	73.8	72.4	1.4
Southeast	72.8	71.5	1.3
<b>State</b>	71.9	70.9	1.0

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	4.35	4.34	0.01	100
North Central	4.27	4.31	-0.03	99
Northeast	4.08	4.08	0.00	100
West Central	5.24	4.33	0.90	121
Central	5.48	4.10	1.38	134
East Central	4.89	4.23	0.66	116
Southwest	4.74	4.10	0.64	116
South Central	5.13	4.09	1.04	126
Southeast	5.87	4.22	1.65	139
<b>State</b>	4.90	4.19	0.71	117

### Summer to date

(same as June)

### Temperature

Region	Temperature	Normal	Deviation
Northwest	70.0	70.0	0.0
North Central	69.5	69.4	0.0
Northeast	69.3	69.1	0.2
West Central	72.4	71.3	1.0
Central	71.6	70.7	0.9
East Central	71.0	69.8	1.2
Southwest	75.6	73.3	2.3
South Central	73.8	72.4	1.4
Southeast	72.8	71.5	1.3
<b>State</b>	71.9	70.9	1.0

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	4.35	4.34	0.01	100
North Central	4.27	4.31	-0.03	99
Northeast	4.08	4.08	0.00	100
West Central	5.24	4.33	0.90	121
Central	5.48	4.10	1.38	134
East Central	4.89	4.23	0.66	116
Southwest	4.74	4.10	0.64	116
South Central	5.13	4.09	1.04	126
Southeast	5.87	4.22	1.65	139
<b>State</b>	4.90	4.19	0.71	117

## Annual-to-date

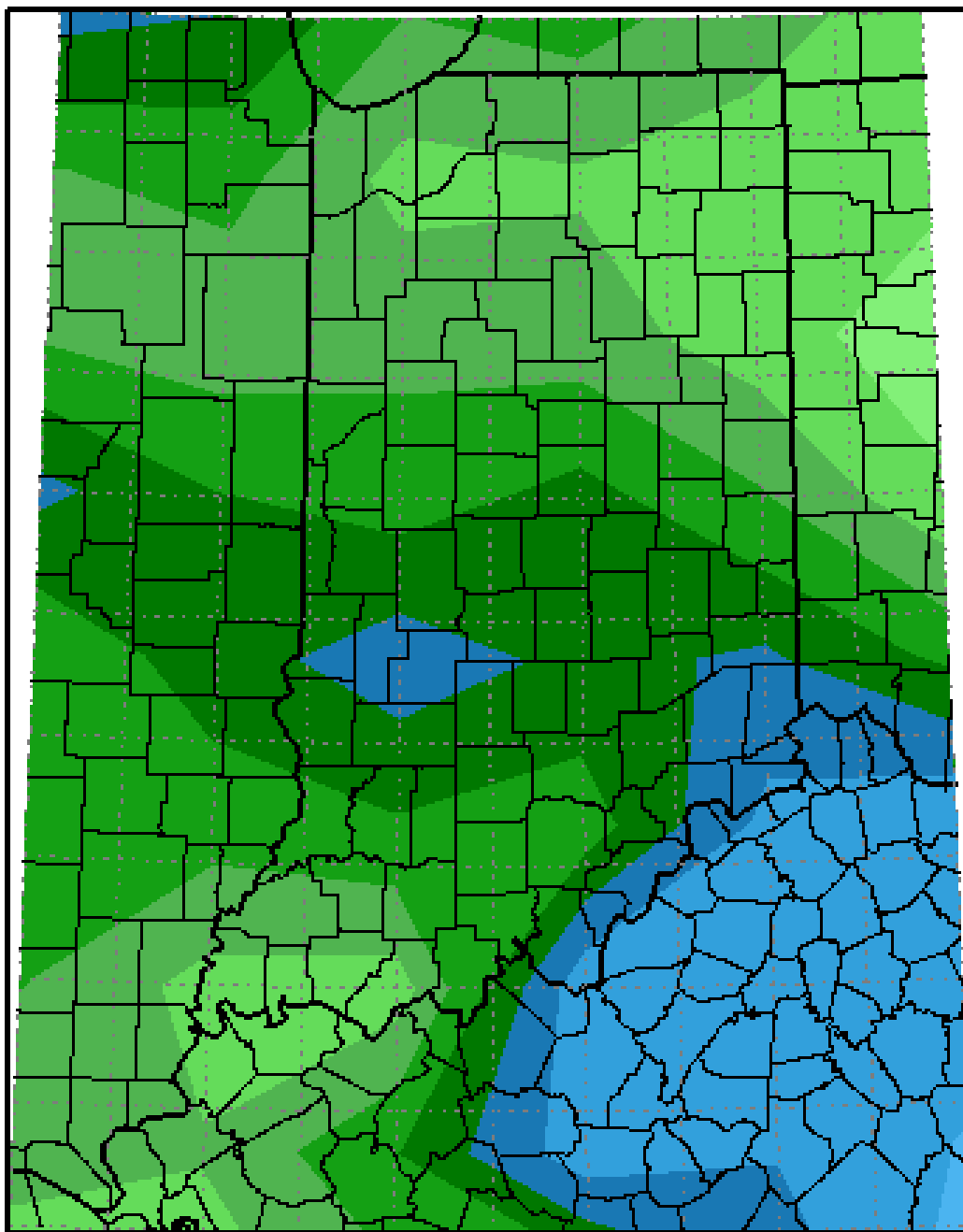
### Temperature

Region	Temperature	Normal	Deviation
Northwest	44.5	45.0	-0.5
North Central	44.2	44.6	-0.4
Northeast	44.0	44.2	-0.2
West Central	47.2	46.9	0.3
Central	46.8	46.5	0.3
East Central	46.2	45.6	0.6
Southwest	51.1	50.5	0.6
South Central	49.8	50.0	-0.2
Southeast	49.2	49.0	0.2
<b>State</b>	47.1	47.0	0.1

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	23.46	18.39	5.07	128
North Central	23.24	18.37	4.87	127
Northeast	22.81	17.80	5.01	128
West Central	25.56	20.39	5.17	125
Central	24.36	20.30	4.06	120
East Central	19.50	19.83	-0.33	98
Southwest	26.65	23.64	3.01	113
South Central	26.45	23.70	2.75	112
Southeast	23.66	23.03	0.62	103
<b>State</b>	24.26	20.65	3.62	118

**Total Precipitation in Inches  
June 1, 2009 to June 30, 2009**

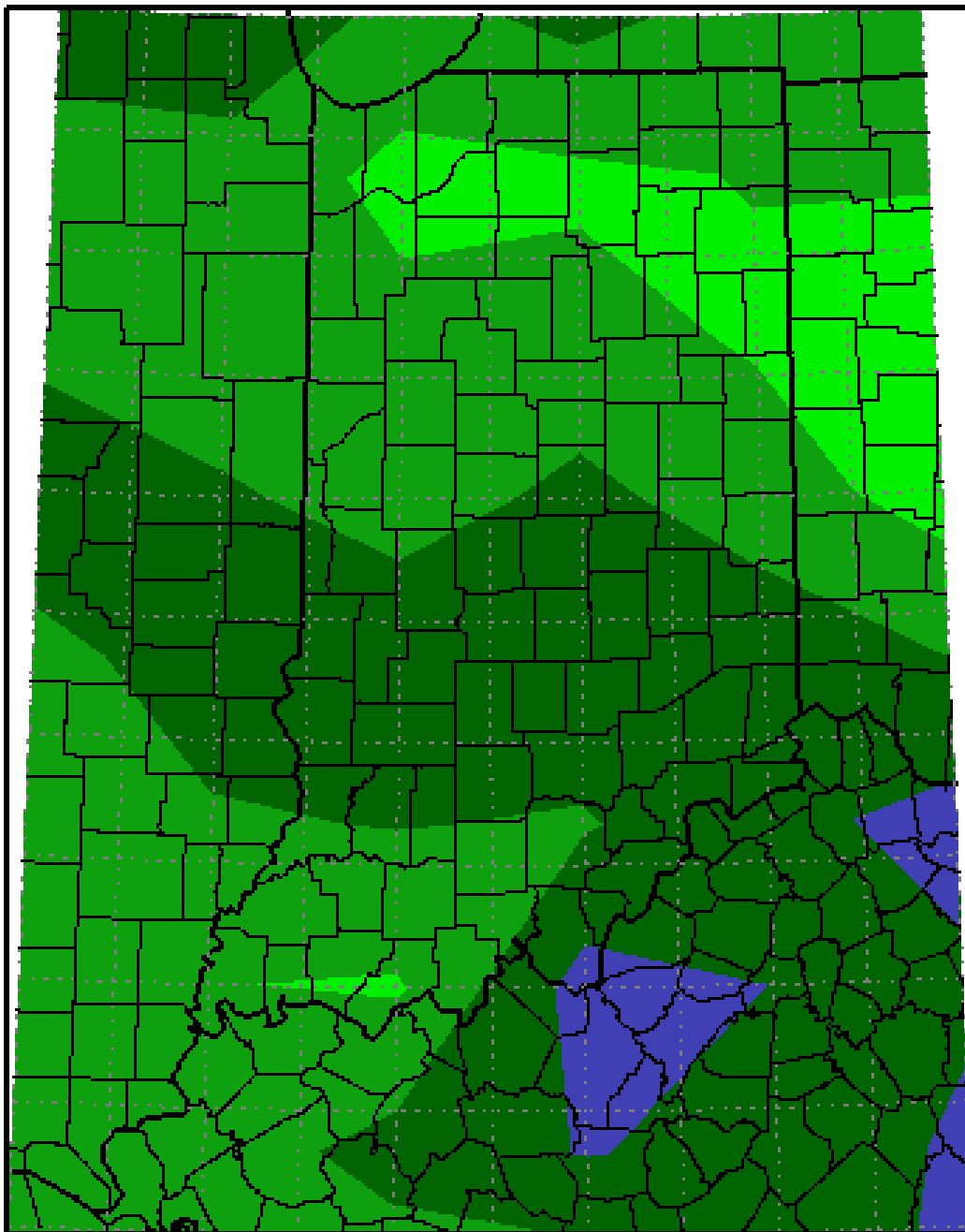


**NOAA Midwestern Regional Climate Center**

**Illinois State Water Survey**

**Champaign, Illinois**

Total Precipitation Percent of Mean  
June 1, 2009 to June 30, 2009



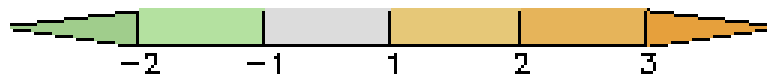
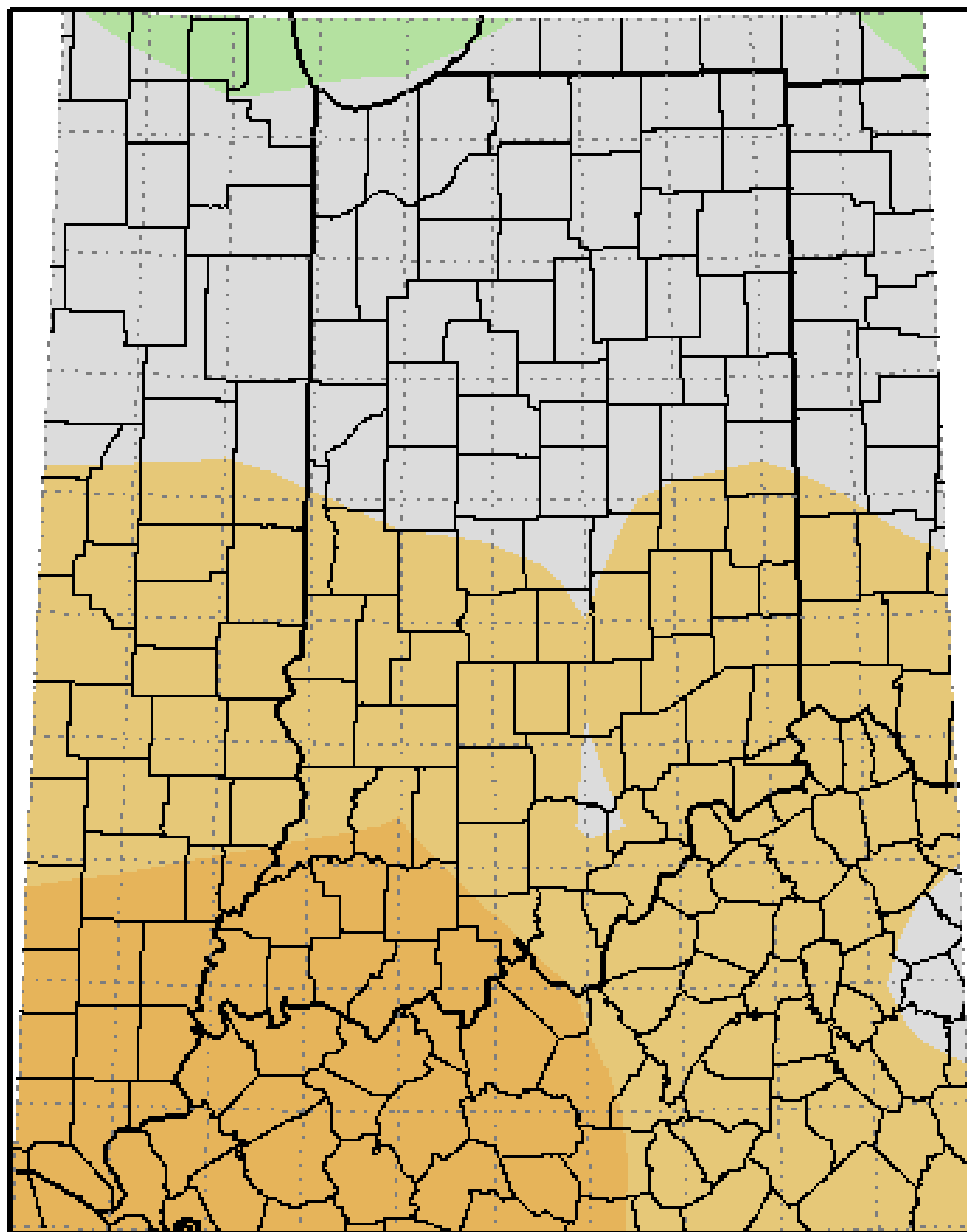
NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois



Average Temperature Departure from Mean in Degrees F  
June 1, 2009 to June 30, 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, June 30<sup>th</sup> has 100% of Indiana under no drought, and 0.00% 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.

D0 Abnormally Dry	D1 Drought - Moderate	D2 Drought - Severe	D3 Drought - Extreme	D4 Drought - Exceptional		
Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
06/30/09	100.00	0.00	0.00	0.00	0.00	0.00
06/23/09	100.00	0.00	0.00	0.00	0.00	0.00
06/16/09	100.00	0.00	0.00	0.00	0.00	0.00
06/09/09	100.00	0.00	0.00	0.00	0.00	0.00
06/02/09	100.00	0.00	0.00	0.00	0.00	0.00

*June 2<sup>nd</sup> Drought Summary*



*June 9<sup>th</sup> Drought Summary*



*June 16<sup>th</sup> Drought Summary*



*June 23<sup>rd</sup> Drought Summary*



*June 30<sup>th</sup> Drought Summary*

