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Indiana State Climate Office

Monthly Weather Report

http://www.iclimate.org

Jul 8, 2011

June 2011 Climate Summary

Month Summary

The abundance of extreme weather this year extended yet another month into June. This month has a reputation for its severe weather, however, so this may not surprise many Hoosiers. Weather related impacts around Indiana in June included 4 confirmed tornadoes, more than 50 water rescues during flash flooding, bridge washouts, river flooding, home fires caused by lightning, and 2 vehicle drivers killed by falling trees.

Summer got off to a fast start with a hot first ten days of June. Then a week of cooler than normal weather set in. Temperatures the rest of the month were generally normal to slightly cooler than normal. Overall for the month the state average temperature calculated to 72.6°, which is 1.6° above normal and places this month as the 26th warmest June in Indiana since 1895. Last year's June temperature of 74.2° was warmer and ranked in 11th place. The split in June 2011 was 15 days of above normal temperature, 13 days of below, and 2 days at normal temperature. The daily mean temperature was never more than 10° below normal, and was at least 10° above normal on 3 days. The highest recorded temperature of the month was 100° on June 5th at Terre Haute. The coldest observed temperature was 36° at Chalmers on June 25th.

The state average precipitation total of 5.34 inches ranks June 2011 as the 22nd wettest June on record in Indiana. The most recent wetter May was last year when the state precipitation was 7.69 inches and ranked in 3rd place. The single wettest day in June 2011 among CoCoRaHS reporters was at Mitchell with 4.66 inches recorded on June 26th. The West Baden volunteer measured 4.54 inches the next day, the second highest daily rainfall this month. On a regional basis June precipitation averaged about 4.0 inches in northern Indiana, 4.8 inches in central, and 6.9 inches in the south. These area totals are right about normal in northern and central Indiana and about 170% of normal in the southern region.

Severe weather was noted on 10 days this June, including a string of 5 consecutive days between June 18th and 22nd. Four tornadoes were confirmed on June 19th, 22nd, and 26th with two unconfirmed on June 4th. At least 26 reports of hail were received by the National Weather Service this month. But it was high winds during storms that proved deadly. In two accidents on June 4th and 21st, large trees snapped and fell on top of two moving vehicles, killing each driver while injuring passengers. As expected in severe weather high winds slammed scores of trees into power lines, flipped vehicles, and destroyed many buildings. In a few cases trees penetrated all floors of homes into basements. Torrential rainfall in central Indiana washed out major highway bridges and triggered more than 50 water rescue calls to stranded motorists. One small Indiana town was completely isolated by flooded highways. Lightning strikes started several home attic fires. Heavy

rainfall in southwest Indiana started another round of river flooding in late June. Week by week descriptions and details of these many severe events and their impacts are found in the narratives which follow below.

June 1st – 10th

Suddenly it was summer. The calendar says summer begins on June 21st but the weather got a jump on the season with hot temperatures in Indiana this week. All of the first 10 days this month had state average temperatures above normal. A 100° temperature on June 5th at Terre Haute was the warmest reported temperature across the state. At several locations this was the earliest heat wave in any year since 1934.

The month opened at 9° above normal then fell to 2° above normal behind a dry cold front. As high pressure moved east of the state temperatures rose to 13° above normal by June 4th in advance of the next storm system. Severe weather erupted throughout the northwest quarter of Indiana on June 4th as a warm front stalled over our state. The warm front washed out the next day and temperatures dropped to 6° above normal for the next few days. A strong Bermuda ridge moved inland from the Atlantic and soon dominated the eastern half of the country. Unseasonably warm conditions followed, as Indiana temperatures rebounded to prior levels at 12° above normal by June 8th.

The next day a strong cool air mass was on the march southward from central Canada. On June 10th this cold front reached Indiana triggering a second round of severe weather, dumping heavy rain, and causing temperatures to fall a few degrees to 7° above normal to close out the 10 day interval. Overall it was a warm 10 days with Indiana temperatures averaging about 8° above normal. Normally at this time of year daily maximum temperatures should range between 79° and 86° north to south across the state. Daily minimums typically vary from 57° in far northern counties to 64° in the far southwest.

There were two severe weather episodes over the 10 days, on June 4th and 10th, and these events largely accounted for all the precipitation which fell. The first storm yielded about a third of an inch of rain in northern Indiana, a little more than a half inch in central, but only about 0.15 inch across the south. The second storm generated about an inch in northern Indiana and a few tenths inch elsewhere. For the 10 days regional rainfall totaled near 1.4 inch in northern Indiana, about 0.8 inch in central, and just a quarter inch in southern Indiana. These totals are near normal in the north, but just 60% of normal in central Indiana, and less than 20% of normal in southern Indiana.

There were of course much heavier amounts in the thunderstorms of northwest and north central Indiana. On the morning of June 5th three CoCoRaHS observers near Kokomo independently measured 3.55, 3.05, and 2.97 inches there On June 10th the Merrillville volunteer received 4.33 inches and the Peru observer had 3.17 inches. For the full 10 day period the heaviest sums were noted in Lake county, including 5.05 inches in Dyer, reports of 5.02 and 4.59 inches at St John, and 4.90 inches in Crown Point.

The severe weather on June 4th was the more damaging event, resulting in 2 unconfirmed tornadoes, 9 reports of hail, and 67 high wind reports. The public reported a tornado touched down near a campground in Pulaski county and a second in White county, but these reports remain unconfirmed.

Hail fell in Miami, Howard, Tipton, Wells and Pulaski counties with diameters ranging between 1.0 and 1.75 inches.

High winds caused 1 death in Madison county. A tree fell on a vehicle leaving Mounds State Park during the storm, killing 1 and injuring another 3 people inside. Wind speeds ranged from 58 mph to 82 mph across Indiana during this storm, damaging roofs and bringing down an enormous number of trees on power lines and vehicles, and blocking roads. Some power outages continued for 3 days in rural areas.

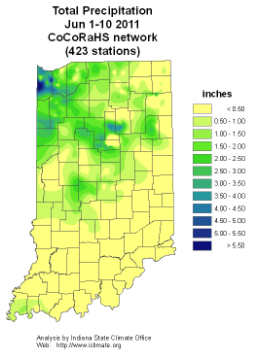
The most intense damage occurred in southern Lake and northern Jasper counties. In Lake county a semi-truck was flipped over by the wind and the roof blown off a roadside weighing station. Garages, farm buildings, and grain bins were destroyed while trees fell on and through houses. In one St John home a tree fell through all levels of the house and into the basement. In Jasper county three grain bins and a barn were lifted up and carried high across a road without touching parked cars on the opposite side. Utility equipment suffered extensive damage in northern parts of the county. Up to 92,000 Indiana customers in northern Indiana lost electricity in the storm. In White county at least 30 utility poles were snapped and a barn roof was blown off. Flash flooding in Carroll county required the rescue of a man from his car swept off the road while a woman needed help to escape her flooded home. To the east in Blackford county windows were blown out of homes. In Madison county there were flash floods, while poles and trees came down, and commercial roofs were carried away. Fallen trees blocked major highways in Marion, Montgomery, and Porter counties. Grain bins and a barn roof were taken off in Miami county. More roofs came off in Warren and Pulaski counties.

A smaller local storm occurred in White, Tippecanoe, and Fountain counties on June 9th in advance of the cold front. Power was knocked out for hundreds of customers that morning but no other damage was reported. The real storm action would happen over a larger area the next day.

The second major severe storm took place on June 10th but was not as devastating as the June 4th event. One-inch hail was noted in Delaware, Madison, Tipton, and Marshall counties. The hail in Delaware and Madison counties fell from the skies for 10 minutes, covering the ground. Power poles and trees came down in Delaware, Randolph, and Boone counties. Trees fell on cars in Putnam county and on a mobile home in Knox county. There were 17 reports of high wind damage, mostly along a line across central Indiana between Parke and Randolph counties. Winds ranged in speed from 60 mph to 74 mph.

With all the rain these past months the mosquito population has exploded in Indiana. Northern counties particularly are battling this problem in June now that hot weather has arrived to accelerate the mosquito breeding cycle.

On a positive note the drier weather at the start of June has allowed Indiana farmers to make headway towards finishing planting of field crops. At the close of this 10 day interval the Indiana Agricultural Statistics Office reports that 96% of corn has now been planted compared to the normal progress of 98% completed by this time. Soybean planting is 78% complete compared to the normal 86%. This places soybean planting about 6 days behind the normal schedule.

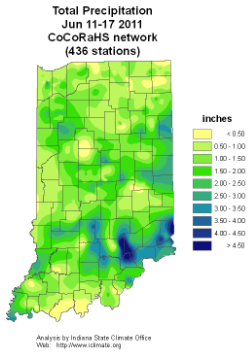


June 11th – 17th

After a torrid start to June last week, temperatures flipped into a mostly cooler than normal regime this second week. Between June 12th and 15th state temperatures averaged 5° to 6° below the normal for this time of year. A warm up was underway near the end of the week as temperatures recovered to 2° above normal. Overall this week temperatures averaged about 2° below normal around Indiana. Typically daily maximum temperatures would range between 83° and 89° north to south across the state. Daily minimums normally vary from 61° in far northern counties to 66° in southwest Indiana.

There was more rainfall this week than last but without the drama of two major severe weather events. A cold front passed through Indiana on June 12th, generally producing less than an inch of rain. Three days of mostly dry weather followed as the cool air mass moved eastward with a high pressure system. An occluded front crossed the state on June 16th and squeezed out roughly another inch of moisture. Upper atmosphere winds were light this week allowing surface fronts to stall in lazy summer fashion. In fact the national surface weather map of June 17th featured a triplet of stationary fronts: one near the Canadian border; a second from Iowa across northern Indiana; and a third straddling southern states from Oklahoma to Georgia. The fronts moving through the state this week triggered storms which together generated about 1.2 inches of rain in northern Indiana, 1.4 inches in central sections, and 2.0 inches across southern Indiana. These amounts are right about normal in the north, 25% above normal in central, and double the normal amount in southern Indiana. Isolated heavier thunderstorms on June 11th in advance of the cold front dumped 3.32 inches in the CoCoRaHS gauge in Lawrenceburg, 3.26 inches at Aurora, 3.21 inches at Austin, and 3.10 inches in Moores Hill. The heavier weekly totals included 4.74 inches in Seymour, 4.01 inches in Lawrenceburg, 3.96 inches at Moores Hill, and 3.93 inches in Aurora.

Storm weary Hoosiers caught a break this week with only two reports of wind storm damage. In southwest Indiana a home lost part of its roof in Stendal while a large tree fell and damaged a vehicle. Utility electrical equipment was also damaged there. Nearby in Dale a cable transmission tower was blown over, an electrical pole was snapped, and some road signs were carried away in the high winds.



June 18th – 24th

Severe weather made a return to our state this week with two confirmed tornadoes in far southern Indiana. Hail was reported in central Indiana on two days and wind damage was common statewide the first half of the week. One man was killed in Tippecanoe county when a tree fell on the vehicle he was driving during a strong thunderstorm.

Temperatures did not stray too far from normal. A stationary front over Indiana on June 18th morphed into a weak cold front the next day, then rebounded as a warm front on June 20th. State average temperatures during this time held to within 1° of normal. A ridge in the upper atmosphere then coaxed warmer air northward into Indiana and surface temperatures rose to 4° above normal in midweek. A cold front on June 23rd was reinforced by another cold push at the close of the week causing temperatures to slip to 6° below normal. Overall for the week temperatures balanced right at normal. Typically this third week of June daily maximum temperatures vary from 84° in northern Indiana to 90° in the far southwest. Daily minimums normally range between 63° and 68° north to south across the state.

With frontal systems in our vicinity rain fell every day with the heavier amounts arriving with the warm air mass. Late in the week pesky showers circulated east to west across Indiana around a sluggish upper low pressure system as it exited to our east. For the week about 1.3 inches was noted across northern Indiana, 2.1 inches in central sections, and 2.8 inches in the south. These totals are near 160% of normal in northern areas, about 230% of normal in central Indiana, and three times normal in the southern part of the state. The greatest single day totals included 4.25 inches at Charlestown on June 24th, 4.10 inches measured on June 20th in Castleton, 4.08 inches reported by the CoCoRaHS observer in Birdseye on June 18th, and 4.00 inches collected in the rain gage on June 20th in Westfield. For the week the Elizabeth observer noted 6.84 inches while 6.43 inches fell at Indianapolis and 6.36 inches was recorded in Maukport.

Severe weather was nearly a daily occurrence. On June 18th 70 mph winds in southern Indiana took down trees, power lines, and a firehouse roof. There were 12 reports of wind damage from Posey, Vanderburgh, Spencer, Knox, Crawford, Orange, Washington, and Harrison counties.

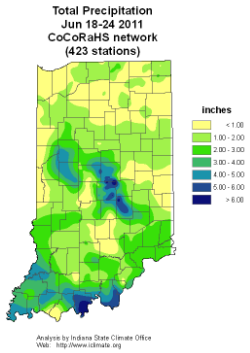
The next day on June 19th an EF0 tornado was confirmed in Perry county. Fortunately this tornado was so brief it did little damage. But wind damage to trees and power lines continued in Harrison, Scott, and Jefferson counties in southern Indiana and in Newton county in the northwest. There were also 11 reports of hail up to 1.75 inch in diameter in Martin, Lawrence, Morgan, Johnson, and Marion counties.

Heavy storms targeted central Indiana on June 20th. Torrential rainfall of up to 7 inches came in waves of thunderstorms, especially impacting Shelby, Johnson, and Marion counties. High water standing on roadways stalled vehicles in several cities and small towns. A bridge was washed out on a main Indianapolis highway and interstate ramps were closed on the east side of the city. The city fire department responded to 56 water rescue calls. The National Weather Service reported its Indianapolis flash flood gauge had reached its highest level since 1971. Some state highways were closed in Shelby county. During the storms all travel into and out of Sheridan was shut down due to high water on roadways. City streets in many central Indiana towns were closed. A home in Dayton was set on fire by a lightning strike as were several attics in at least 24 homes in Marion and Johnson counties. A roof at a construction site in Greenwood collapsed under the weight of rain water. Power outages were widespread and 1 inch diameter hail was noted in Marion, Johnson, and Ripley counties. High winds in Shelby, White, Cass, and Decatur counties downed trees and power lines on houses and roadways. Some power poles were snapped by the winds.

Extensive wind damage continued on June 21st, as reported in Jackson, Bartholomew, Elkhart, Tippecanoe, Whitley, Dekalb, Steuben, Kosciusko, Laporte, and Lake counties. A house trailer was damaged and trees fell on power lines which blocked state highways. Thousands were without power around central Indiana. Some power poles were snapped and signs blown down. In Tippecanoe county a doctor and his son were traveling Indiana 43 in West Lafayette when high winds snapped a tree along the highway. Despite evasive maneuvers the tree fell on top of the vehicle and killed the driver instantly but spared his son.

On June 22nd a weak EF0 tornado touched down in Harrison county. The tornado caused minor damage as some trees were uprooted and siding was removed from a home. The path length was about 600 yards and maximum wind speeds were estimated near 75 mph.

Finally the 5 consecutive days of severe weather were over. No storm damage was reported on June 23rd and 24th as the week came to a close.



June 25th – 30th

After a wild weather weekend the final days of June passed peacefully by. Temperatures held a little on the cool side of normal every day this week. The state average temperature rose a few degrees from 4° below normal at the start before leveling off at 1° below normal on June 27th. The average temperature remained here the rest of June except for one cooler day when the thermometer slipped a bit to 3° below normal. Normally daily maximum temperatures this last week of June vary between 85° and 91° north to south across the state. Daily minimums range from 64° in northern counties to 69° in far southwest Indiana.

A warm front slowed and stalled along the Ohio River as it approached Indiana on June 26th. Storms overran the stationary front and dropped about 2 inches of rain in southern Indiana in the next few days. Amounts decreased northward away from the front with about a 0.7 inch total in central Indiana and just 0.1 inch across the northern third of the state. These totals are about two and half times the normal in southern Indiana this week, about 80% of normal across central Indiana, and less than 20% of normal in northern Indiana. Of course there were significantly higher amounts at some CoCoRaHS locations. Large single day measurements included 4.66 inches at Mitchell on June 26th, while Washington noted 4.33 inches, Loogootee 4.26 inches, and Austin 4.11 inches that same day. The West Baden observer reported 4.54 inches the next day. A weak cold front passed through Indiana on June 28th but produced very little or no rainfall. For the week the highest CoCoRaHS totals were 6.45 inches in Mitchell, 4.97 inches at Washington, and 4.36 inches in Shoals, among others.

Severe weather broke out over southern Indiana between June 25th and 27th. On the first day high winds caused trees to fall onto power lines, blocking roads and damaging roofs and doors in Dubois and Spencer counties.

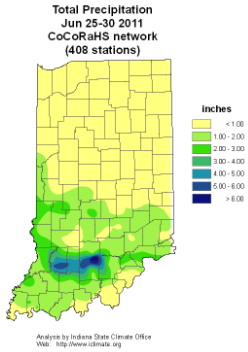
Two tornadoes were confirmed on June 26th. In Dubois county an EF1 tornado with a path length of 2.2 miles was later confirmed by the National Weather Service. This tornado caused minor damage to homes and uprooted and snapped off trees in its path. Another EF1 tornado was confirmed the same day, this time touching down in Spencer and Perry counties. This tornado packed winds at 100 mph and traveled 2.3 miles. A cinder block building was destroyed, roofs

were torn off homes and many trees were snapped off or uprooted. The roof of one metal building was sheared off for 100 feet.

Wind damage continued the next day to the west. In Vanderburgh county a microburst with 75 mph winds tore down a large building and several smaller buildings. There was minor damage to homes and tree limbs were pulled down over the half mile path length.

On the last day of the month 1 inch diameter hail was noted in the northwest corner of the state in Lake and Power counties but no significant damage was reported.

With the heavy rains in southern Indiana flooding was once again on the watch list. Flooding on the lower White River commenced on June 26th and is expected to continue through Independence Day.



June 2011

Temperature

Region	Temperature	Normal	Deviation
Northwest	70.8	70.0	0.8
North Central	70.7	69.4	1.3
Northeast	70.6	69.1	1.6
West Central	72.4	71.3	1.0
Central	72.0	70.7	1.3
East Central	71.7	69.8	1.9
Southwest	75.9	73.3	2.6
South Central	74.8	72.4	2.4
Southeast	73.3	71.5	1.7
State	72.6	70.9	1.6

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	5.24	4.34	0.90	121
North Central	4.04	4.31	-0.27	94
Northeast	2.64	4.08	-1.45	65
West Central	5.12	4.33	0.79	118
Central	5.40	4.10	1.30	132
East Central	3.78	4.23	-0.45	89
Southwest	7.21	4.10	3.10	176
South Central	7.03	4.09	2.94	172
Southeast	6.50	4.22	2.28	154
State	5.33	4.19	1.14	127

Summer 2011 (so far same as June)

Temperature

Region	Temperature	Normal	Deviation
Northwest	70.8	70.0	0.8
North Central	70.7	69.4	1.3
Northeast	70.6	69.1	1.6
West Central	72.4	71.3	1.0
Central	72.0	70.7	1.3
East Central	71.7	69.8	1.9
Southwest	75.9	73.3	2.6
South Central	74.8	72.4	2.4
Southeast	73.3	71.5	1.7
State	72.6	70.9	1.6

Precipitation

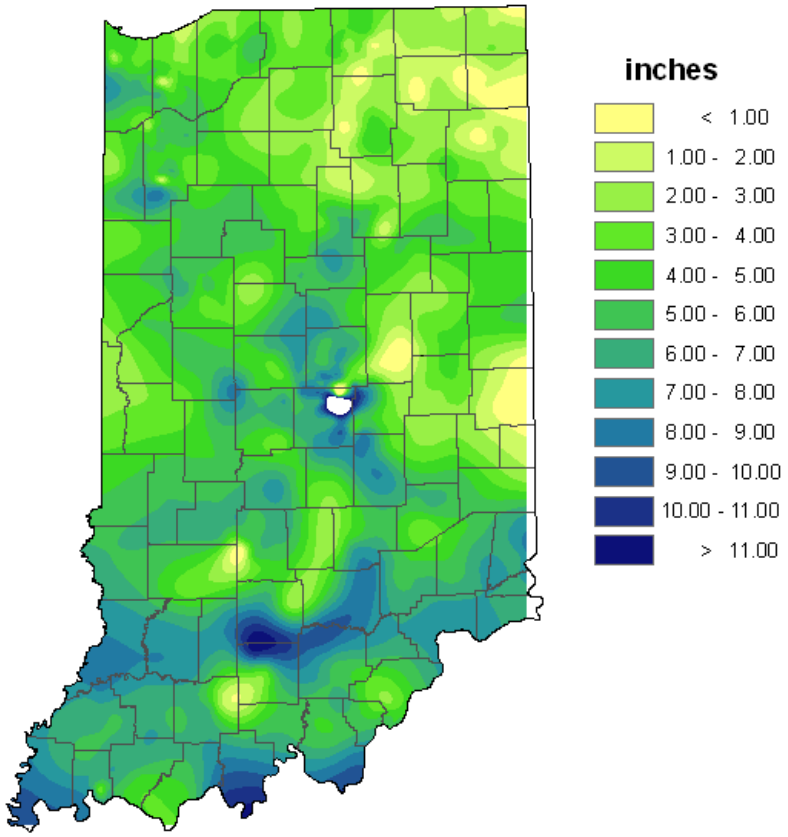
Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	5.24	4.34	0.90	121
North Central	4.04	4.31	-0.27	94
Northeast	2.64	4.08	-1.45	65
West Central	5.12	4.33	0.79	118
Central	5.40	4.10	1.30	132
East Central	3.78	4.23	-0.45	89
Southwest	7.21	4.10	3.10	176
South Central	7.03	4.09	2.94	172
Southeast	6.50	4.22	2.28	154
State	5.33	4.19	1.14	127

2011 Annual so far

Region	Temperature	Temperature Normal	Deviation
Northwest	44.6	45.0	-0.5
North Central	44.3	44.6	-0.3
Northeast	44.0	44.2	-0.2
West Central	47.1	46.9	0.2
Central	47.0	46.5	0.5
East Central	46.4	45.6	0.8
Southwest	51.4	50.5	0.9
South Central	50.9	50.0	0.9
Southeast	49.8	49.0	0.8
State	47.4	47.0	0.3

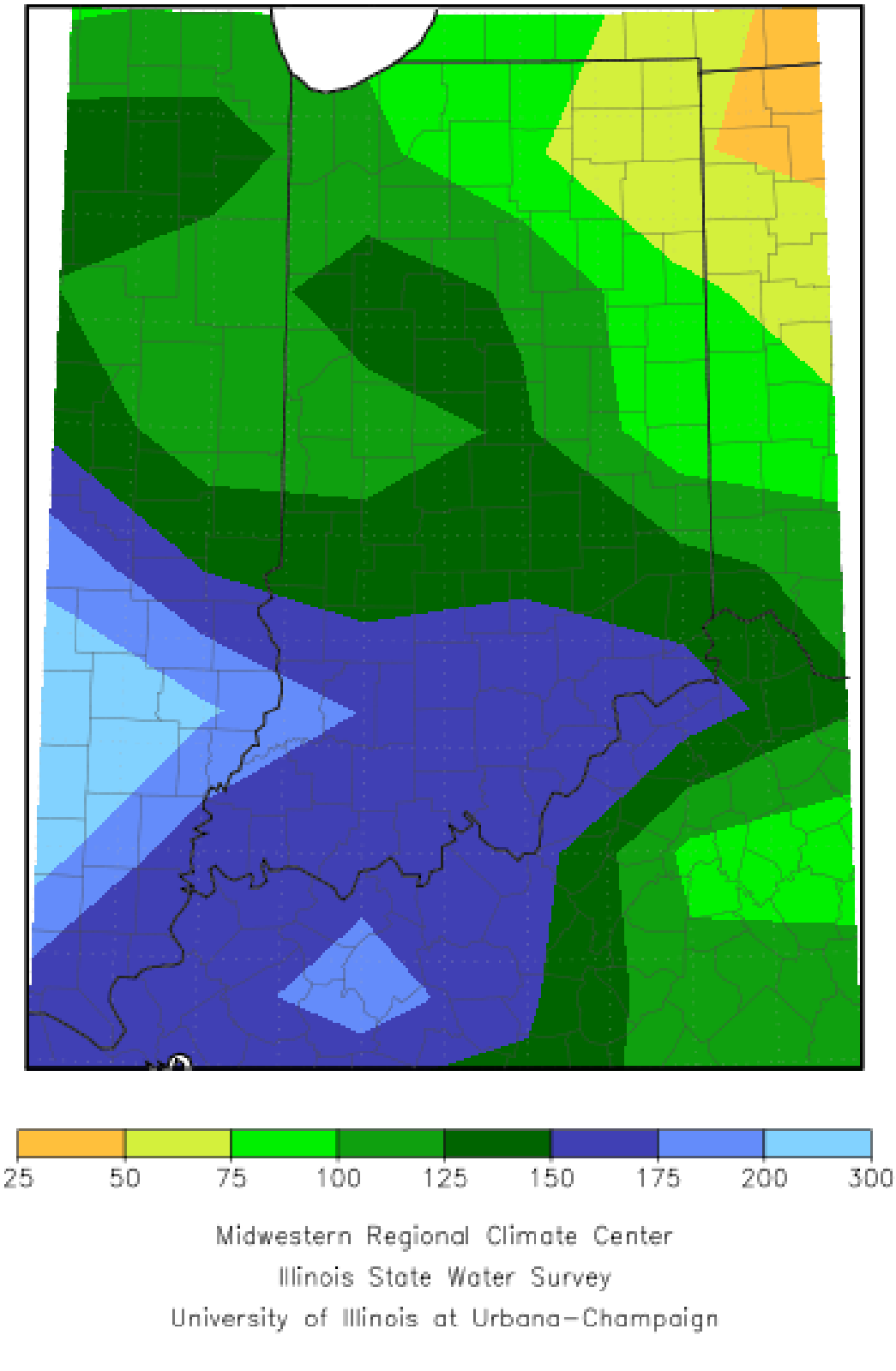
Region	Precipitation	Precipitation Normal	Deviation	Percent of Normal
Northwest	25.14	18.39	6.75	137
North Central	24.74	18.37	6.36	135
Northeast	23.98	17.80	6.18	135
West Central	28.38	20.39	7.99	139
Central	31.63	20.30	11.33	156
East Central	30.30	19.83	10.47	153
Southwest	36.56	23.64	12.91	155
South Central	37.22	23.70	13.53	157
Southeast	37.73	23.03	14.69	164
State	30.68	20.65	10.04	149

Total Precipitation
June 2011
CoCoRaHS network
(459 stations)



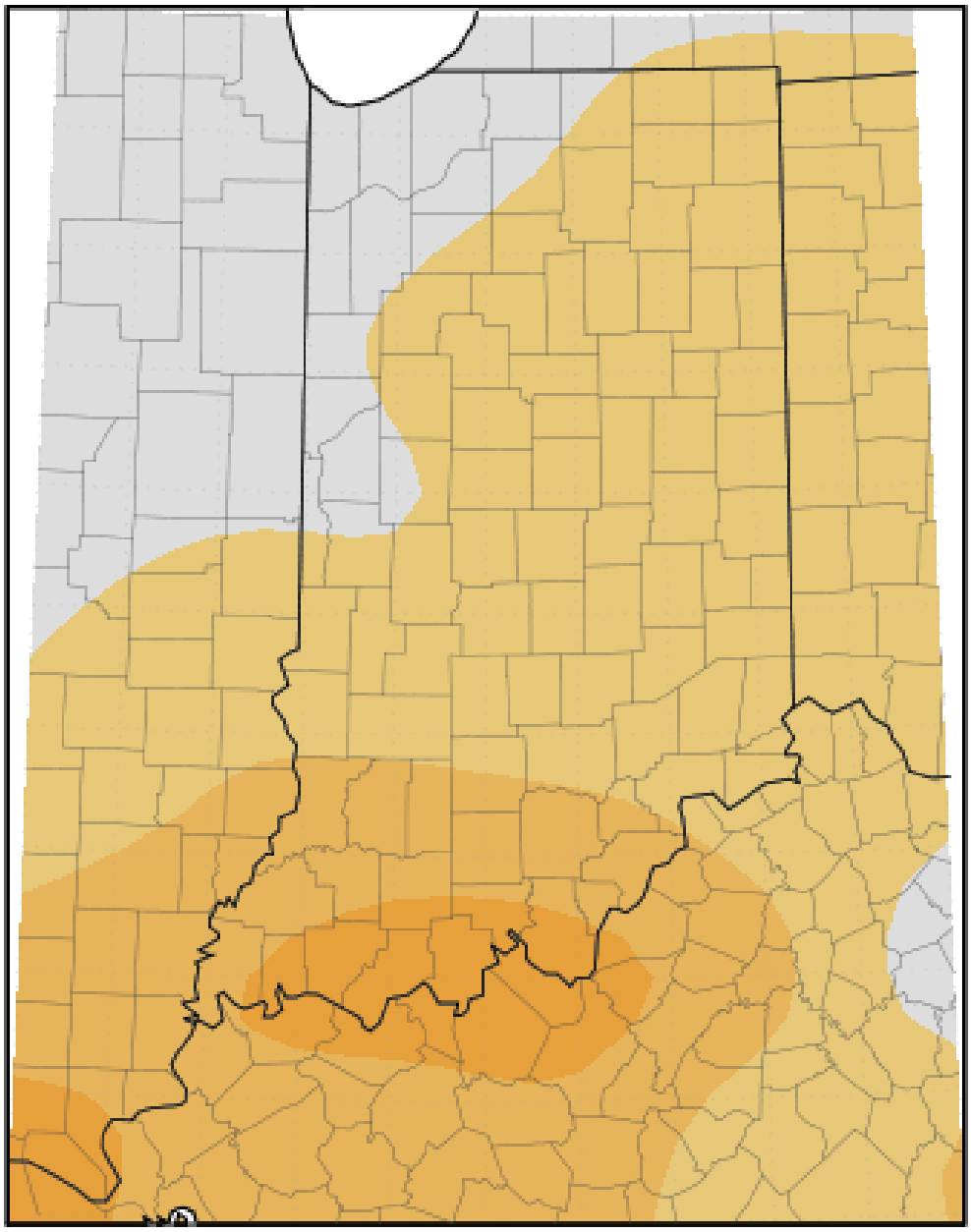
Analysis by Indiana State Climate Office
Web: http://www.iclimate.org

Total Precipitation: Percent of Mean
June 1, 2011 to June 30, 2011



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

Average Temperature (°F): Departure from Mean
June 1, 2011 to June 30, 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, June 28th 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.

Drought Condition (Percent Area): Indiana

Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
06/28/11	100.00	0.00	0.00	0.00	0.00	0.00
06/21/11	100.00	0.00	0.00	0.00	0.00	0.00
06/14/11	100.00	0.00	0.00	0.00	0.00	0.00
06/07/11	100.00	0.00	0.00	0.00	0.00	0.00

June 7th Drought Summary

June 14th Drought Summary

June 21st Drought Summary

June 28th Drought Summary