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and
Matt Price**

Indiana State Climate Office

Monthly Weather Report

Jul 8, 2013



<http://www.iclimate.org>

June 2013 Climate Summary

Month Summary

A year ago June weather made Indiana headlines for its extreme heat and drought. Gone are the heat and dryness as this year June temperatures averaged remarkably normal while rainfall was relentless and heavy too much of the time. Farmers had to replant crops in drowned out wet spots in their fields. Severe weather occurred on a dozen days this month including on 7 consecutive days late in the month. An EF-1 tornado caused damage in Perry county on June 26th while 3 children at a summer camp in Boone county were struck by lightning on June 29th.

The June state average temperature was 71.1°F, essentially normal with a deviation of just +0.1°F. The day split was fairly balanced with 12 days of below normal temperature, 15 days above normal, and 3 days right at normal. There were no days that the daily state average temperature was 10°F or more above or below normal. The warmest temperature in the state this month was 98°F observed on two dates: on June 20th at Poseyville and two days later in Brookville. The coldest reading in the state was a 34°F reading at Lowell on June 4th.

The state average precipitation was 6.27 inches, a surplus of 2.08 inches above normal. This places June 2013 as the 11th wettest June in Indiana since 1895. The most recent wetter June was in 2010 with a 7.69 inch amount, the 3rd wettest June on record. Some other recent wetter Junes include the 8th place 6.41 inch average recorded in 2008 and a 6.30 inch value in 2000, good for 10th place. The wettest June on record in Indiana was the abundant 8.08 inches of rain noted in 1958. Regionally June 2013 precipitation was about 160% of the 4.3 inch normal in northern Indiana, near 120% of the 4.2 inch normal in central, and 170% of the 4.1 inch normal in the south. The highest single day cooperative station precipitation this month was 5.00 inches recorded at Columbia City on June 1st. The heaviest CoCoRaHS single day precipitation amount was 5.46 inches collected at Warsaw also on June 1st. Widespread rain fell often on about 22 days this month.

One tornado occurred this month in Perry county. There were several days of local torrential rainfall, wind damage, and flooding. Wind damage was reported across more than 20 counties on June 12th. One person was injured in Newton county when winds brought down power lines on June 24th. Details on each severe weather day are found in the weekly narratives which follow.

June 1st – 8th

As the new month began an unstable sector of warm air continued to envelope Indiana, already responsible for the severe weather which erupted on May 31st. State average temperatures the first day of June were warm but not extremely so at nearly 2°F above normal. The rest of the interval would remain colder than average. A cold front passed through the state on June 2nd followed by high pressure the next day which transferred colder air from Canada. Temperatures fell to 7°F below normal but as skies cleared a slow warming trend lifted temperatures to 2°F below normal by June 5th. A weak cold front now pushed through Indiana on June 6th but temperatures dipped only slightly to 4°F below normal. As the interval closed another high pressure ridge moved overhead the state while temperatures changed little. Overall for the 8 days the state temperature averaged about 3°F below normal. Typically at the start of June daily maximum temperatures should range between 76°F and 83°F north to south across Indiana. Normal daily minimums should vary from about 55°F in far northern Indiana to 61°F in the far southwest.

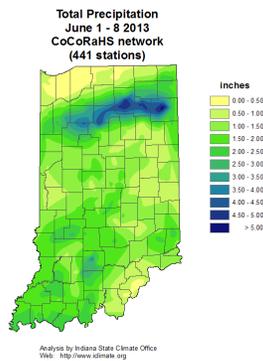
Rainfall which occurred after mid-morning on May 31st is officially reported into June and those data are tallied into this first interval. The remainder of the 8 days was mostly dry with just a few tenths of an inch reported during the passage of each cold front. For the entire interval total precipitation was about 1.6 inch in northern Indiana and southern Indiana with 1.2 inch in central counties. These totals equate to near normal in the central part of the state and near 130% of normal to the north and south. Some of the June 1st storm totals were impressive. Four CoCoRaHS volunteers in the Fort Wayne area reported 5.35 inches, 5.27 inches, 4.84 inches, and 4.76 inches in their gages that morning. For the entire 8 days some other cities with large totals included 4.81 inches at Claypool, 4.72 inches at Winona Lake, with two Columbia City reports of 4.63 and 4.24 inches, all in northeast Indiana.

The full impact of severe weather in northwest and southwest Indiana in the closing hours of May wasn't known until early on the first day of the new month. Damage due to flash flooding and high winds was evident but the after effects of the tornado which touched down in a Benton county farm field were not significant.

The flooding scene in Fort Wayne on June 1st was chaotic. Several people had to be rescued from their cars submerged in high water on city streets while others were evacuated from flooded homes and apartments. Some apartments were affected by sewage flood waters. Staff at the Fort Wayne Children's Zoo had to move over 1,000 animals to higher ground overnight. No animals were injured in this process and the zoo was closed for the day while cleanup continued. Some Fort Wayne roads were washed out and many others flooded.

Flooding occurred along the Wabash River. In Carroll county several roads were closed and some families had to evacuate their homes. Flooding was also reported along rivers in White and Tippecanoe counties. Fortunately there were no reports of major damage or injuries.

The flooding also affected some crop land. Some replanting of crops will be needed while some wheat acreage suffered wind damage from the May 31st storm. According to the weekly Indiana Crop and Weather Report, 94% of all intended corn planting in the state has now been completed and 76% of the soybeans are finished planting.



June 9th – 15th

Two storm systems moved through Indiana this week. The second system was the stronger of the two and caused widespread wind damage across northern Indiana. The swing in temperature during the week though was not dramatic. This is usually the case as we approach summer and the coldest air of spring retreats into Canada.

Daily state average temperatures to start the week were right about normal. A stationary front lie across the state on June 9th, then passed south of Indiana the next day as a cold front. This front and the high pressure ridge behind it were weak. The front had no real impact on state average temperature as it actually warmed to 4°F above normal by June 11th. A new stronger storm system now slid its warm front across Indiana the next day. The state temperature peaked at about 7°F above normal. Thunderstorms and high winds announced this warm air mass, causing widespread damage on July 12th. The warmth didn't last long. The next day a cold front rushed across the state and temperatures fell to 1°F above normal. High pressure behind this cold front was stronger than the high center earlier in the week, cooling Indiana temperatures to 5°F below normal. This ridge moved quickly east of Indiana to close the week on July 15th. State temperatures recovered a bit to 3°F below normal.

Overall for the week daily state temperatures averaged near 1°F above normal. Typically in this second week of June daily maximum state temperatures should range between 79°F and 85°F north to south across the state. Daily minimums normally vary between 58°F in far northern Indiana to 63°F in the far southwest.

It rained somewhere in Indiana just about every day this week. Daily amounts were light except for readings on the mornings of June 10th and 13th. A half inch fell generally on June 10th but a 2 to 3 inch band of heavy rain fell northeastward from Greene to Wabash county. The CoCoRaHS observer at Tipton received torrential rainfall with 4.42 inches that day. In nearby Atlanta 3.41 inches was recorded. The next heavy rain event reported on June 13th included a 1 to 2 inch area that covered much of the northern third of the state. The heaviest CoCoRaHS reports included 3.42 inches and 3.26 inches at two locations in Hometown and 3.39 inches in Kokomo. For the full

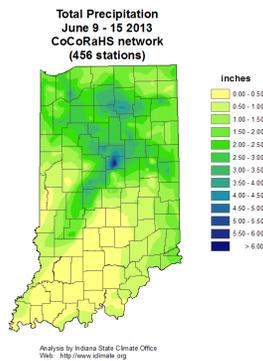
week northern Indiana averaged about 2.3 inches, the central part of the state around 1.6 inches, and 0.8 inch across the south. These totals equate to double the normal in the north, about 170% of normal in central counties, and 90% of normal in southern Indiana. The CoCoRaHS volunteer at Tipton noted the highest total for the week at 6.34 inches. Other large week totals included 4.80 inches in Atlanta while three Kokomo observers had 4.55 inches, 4.30 inches, and 4.29 inches. A map of the distribution of weekly rainfall totals is found at the end of this narrative.

There were two episodes of severe weather this week. Reports from the first event came in late on the evening of June 9th and were limited to Grant county. A grain silo was destroyed and part of a barn roof was ripped off. A carport was blown away and the usual tree damage associated with such events also occurred.

The second severe weather event took place during the late evening and overnight hours of June 12th and impacted more than 20 counties. Most of these incidents occurred in the northern third of the state and involved trees falling on top of things. Trees fell across roadways in Lake and Clinton counties. Trees fell into houses in Cass and Fulton counties. Some trees simply fell...without causing other damage as noted in Newton, White, Tippecanoe, Howard, Wells, Grant, and Shelby counties. In Miami county 80 mph winds uprooted trees there.

Not all the severe weather damage involved trees. High winds played havoc with vehicles. An RV was overturned in Adams county and in Huntington county a semi-trailer was flipped by winds while traveling I-69. Buildings fared no better. A hog barn was damaged in Miami county and power lines fell. In adjacent Wabash county a grain silo and two pole barns were destroyed in straight line winds clocked at 95 mph. Homes lost their roofs in Lake and Miami counties while siding was ripped from houses in Benton county. Winds to 80 mph tore through high tension power lines in Lake county, cutting power to 35,000 customers. Lightning struck a business in Tippecanoe county, starting it on fire. In that same area a car became stranded after it was driven into a flooded street that lacked road closed signs. Some large hail was reported throughout the damage area. One inch hail was observed in Lake, Fulton, Carroll, Whitley, and Allen counties. Hail up to 1.25 inch in diameter fell in Marion county while 1.75 inch hail dented cars in Pulaski county.

With the heavy rain this week standing water in crop fields will require replanting in submerged spots. According to the weekly Indiana Crop and Weather Report, a few farmers in southern Indiana have already switched from corn to planting soybeans due to the weather delays. Nearly all the corn acreage has emerged. About 93% of soybeans have been planted with 83% of those beans emerged. Winter wheat is very near maturity.



June 16th – 22nd

Indiana weather seemed more restrained this week than last. Rain still fell almost daily but amounts were decidedly less. Severe weather was reported on more days but the impact area was confined to just one to two counties per episode, affecting fewer people and damaging less property.

A warm up was underway on June 16th and 17th as temperatures rebounded to nearly 5°F above the normal mark. Indiana was within a sector of warm air with cold fronts poised on the northern state border. On June 18th a first cold front moved through Indiana with a slowing second cold front close behind it. That second front did manage to reach the Ohio River the next day but here it stalled. Colder air was able to flow in behind the fronts and cool the state temperature to 3°F below normal. On June 20th the two fronts regained momentum and continued south into the Gulf states where they merged and stalled again. But these fronts had lost their influence on our weather. Rather a high pressure ridge in New England increased in strength and sprawled westward on June 21st and 22nd. As the week closed Indiana was located on the western edge of this expanding ridge. State temperatures were on the rise again, moving to 2°F above normal by June 21st, then almost to 5°F above normal to end the week as the ridge intensified. The overall state average temperature for the entire week was about 1°F above normal. Typical daily maximum temperatures for this time of year vary from about 81°F in far northern Indiana to 87°F in the far southwest. Normal daily minimums would range between 60°F and 65°F north to south across the state.

Rainfall was frequent but mostly light with just one to two tenths inch per day. In a flip from last week the heaviest showers were now in southern Indiana rather than in the north, in the vicinity of the stationary front on the Ohio River. Total precipitation for the week was about 0.4 inch in northern and central Indiana and about an inch across the south. These totals represent about 50% of normal in northern and central counties but more than double that at 125% of normal in southern Indiana. Locally heavy rain was recorded on the morning of June 18th in south central Indiana and in northwest and west central Indiana on June 22nd. On June 18th the CoCoRaHS observer in Leopold captured 2.38 inches in the rain gage. The Birdseye volunteer had 2.31 inches and at Marengo 2.11 inches was noted. On June 22nd the Wheatfield gage collected 1.83 inches. The highest weekly rainfall totals were in south central Indiana with 2.67 inches in Milltown, 2.63 inches at Birdseye, and 2.43 inches at Mauckport. In southwest Indiana Petersburg had 2.33 inches

and Washington 2.25 inches for the week. An Indiana total rainfall map is found after this narrative.

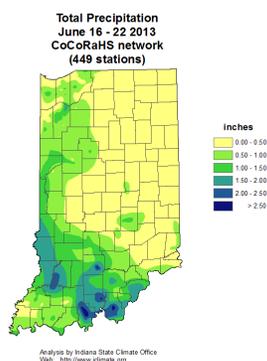
Isolated severe weather events were reported on four days this week. On June 16th wind gusts brought down large trees in Harrison county and many smaller trees in neighboring Floyd county.

The next day one inch diameter hail was noted just to the northeast in Clark county. Several trees and limbs fell far to the west in Knox county that day.

The wind damage intensified in Knox county on June 18th. More trees came down this time on power lines and across roads.

After three days of isolated severe weather events there was a three day break. Then on June 22nd the action moved to northern Indiana. In Miami county high winds toppled trees which blocked state highways. To the east in Huntington county gusts tore the siding off a building, shingles off another, and blew the doors off a barn. Trees fell on state highways there forcing motorists to an alternate route for a time.

The Indiana Agricultural Statistics office reports farmers took advantage of less rainfall this week to catch up on postponed farm activities. Some irrigation systems were turned on in the sandy soils of northern counties. Crops in drowned out low spots around Indiana were being replanted where soils had dried enough for equipment access. In areas with a longer string of dry weather days farmers could finally cut and bale hay. Some winter wheat harvest was underway in southern Indiana.



June 23rd – 30th

Indiana weather was very active in these closing days of June. Rain fell on every day somewhere in the state, heavily on two days. Severe weather was reported on 6 of the 8 days, including an EF1 tornado in Perry county on June 26th.

Daily state temperatures were above normal until the last two days of the interval. As has been the case this month the range in state average temperature was not extreme.

A ridge of high pressure was sprawled over the eastern half of the country on June 23rd. Indiana was located on the warm west side of this ridge, keeping state temperatures the first 3 days about 4°F to 5°F above normal. A cold front sagged south to the Indiana-Michigan border on June 25th as temperatures dipped just a few degrees under cloudy skies to about 3°F above normal. The front was pushed back north temporarily on June 26th but the next day this now weak cold front finally managed to pass all the way through Indiana.

A second stronger cold front moved through Indiana right behind the first on June 28th, filtering cooler air into the state and lowering temperatures to 2°F above normal. The cool air flow continued to the end of the month, dropping state temperatures to about 4°F below normal. Over the 8 day run state temperatures averaged about 2°F above normal. Usually over this late June interval daily maximum temperatures are expected to range between 82°F in far northern counties to 88°F in the far southwest. Daily minimums normally vary between 62°F and 67°F north to south across the state.

Rain fell every day but the largest amounts were recorded on June 26th and 27th. This was when the stagnant cold front on the Michigan border retreated northward, then regrouped the next day before slipping south to the Ohio River. From 1 to 3 inches of rain drenched central and southern areas of the state over these two days. Locally torrential rainfall was measured in scattered spots, including 5.65 inches at Michigan City and 4.51 inches in Trail Creek on June 26th. The next day West Terre Haute had 4.89 inches and Fredericksburg recorded 4.57 inches in their rain gage. For the full 8 day interval precipitation generally totaled around 2.4 inches in northern Indiana, 2.0 inches in central, and 2.3 inches in southern Indiana. These totals equate to about double the normal in the north, 180% of normal in central sections, and more than triple normal in the south. These numbers include of course locally intensive totals such as 7.36 inches in Fredericksburg, 6.84 inches in Shoals, 6.62 inches at Francisco, 6.36 inches in Jasonville, and 6.15 inches in Sullivan.

The extended conflict between warm and cool air masses meant plenty of severe weather days. On June 22nd damaging wind gusts struck Huntington county as storms were winding down there.

The damage inventory increased as the days went on. On June 23rd trees fell on a house in Boone county. Some trees covered roads in Morgan and Dearborn counties. In Marion county power lines blocked lanes of I-465 as more trees came down. One inch hail fell along with trees in Ripley county.

On June 24th wind damage was widespread in 14 counties. Power lines were ripped down in several counties causing power outages. Winds to 80 mph ripped down high tension power lines in Lake county. More downed power lines were reported in Stark, Elkhart, Kosciusko, and Whitley counties. Dangerous situations evolved when some power poles were uprooted and lines fell on cars in Newton and Marshall counties. Trees and power lines became entangled in Benton and Tippecanoe counties. Winds were clocked to 67 mph in St Joseph county where fallen trees closed a few roads. In northeast Indiana siding was ripped off a Whitley county home while 63 mph winds lifted a camper into the air in Allen county.

The next day storms moved over the same spots repeatedly, generating downpours and flash flooding, large hail, and winds of 65 mph over northeast Indiana. Heavy rainfall continued

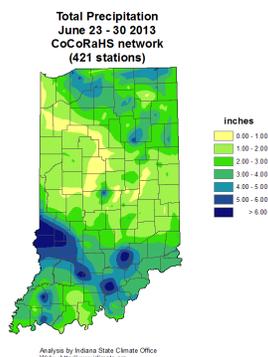
overnight. Laporte received flooding rains of 4 to 6 inches which washed away some roads. Trees fell on power lines in Steuben and Elkhart counties, knocking out power to those areas.

On June 26th the action moved south. An EF1 tornado touched the ground for 5.2 miles in Perry county. The tornado was 100 yards wide and carried winds of 60 to 95 mph. Damages included large trees, parts of roofs, and rural out buildings. A semi-trailer was overturned and rides blown around at a local carnival. Non-tornado damages were noted in adjacent Spencer county where 62 mph winds caused trees to fall into power transformers and power lines. In Lawrence county a tree fell on a house, out buildings were destroyed, and cars and garages were damaged. A tree also fell on a house in Daviess county. More trees were toppled in Knox and Harrison counties.

The next day the destruction shifted from wind damage to hail. An unstable atmosphere allowed storms to become severe, producing hail up to 2 inches in diameter in Allen and Marshall counties, and up to 1.75 inch in Lake county. Hail sizes reached 1.25 inch in St Joseph and Howard counties. One inch hail was seen in Cass, Miami, Huntington, and Adams counties. Meanwhile high winds added to the misery. Gusts to 77 mph tore down power lines in Lake county. In Fulton county power lines fell on roadways. A barn roof was torn off in Adams county and fallen trees littered the ground in Fayette and Franklin counties.

The severe weather continued another day but on a smaller scale. On June 28th one inch hail was reported in Huntington and Crawford counties. Trees fell on power lines in Wayne county and scattered trees were toppled in Marion county.

Less severe thunderstorms continued on June 29th. Yet a lightning strike near Zionsville in Boone county struck 3 children who were participating in a summer camp. One child was badly injured and in critical condition in a hospital.



June 2013

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	69.4	70.0	-0.6
North Central	69.3	69.4	-0.1
Northeast	69.4	69.1	0.4
West Central	71.0	71.3	-0.4
Central	71.0	70.7	0.4
East Central	70.6	69.8	0.8
Southwest	73.2	73.3	-0.1
South Central	73.0	72.4	0.6
Southeast	72.2	71.5	0.6
State	71.1	70.9	0.1

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	6.21	4.34	1.87	143
North Central	7.36	4.31	3.06	171
Northeast	6.71	4.08	2.63	164
West Central	5.30	4.33	0.97	122
Central	5.07	4.10	0.97	124
East Central	4.91	4.23	0.68	116
Southwest	7.44	4.10	3.34	181
South Central	7.50	4.09	3.41	184
Southeast	5.74	4.22	1.52	136
State	6.27	4.19	2.08	150

Summer so far (same as June)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	69.4	70.0	-0.6
North Central	69.3	69.4	-0.1
Northeast	69.4	69.1	0.4
West Central	71.0	71.3	-0.4
Central	71.0	70.7	0.4
East Central	70.6	69.8	0.8
Southwest	73.2	73.3	-0.1
South Central	73.0	72.4	0.6
Southeast	72.2	71.5	0.6
State	71.1	70.9	0.1

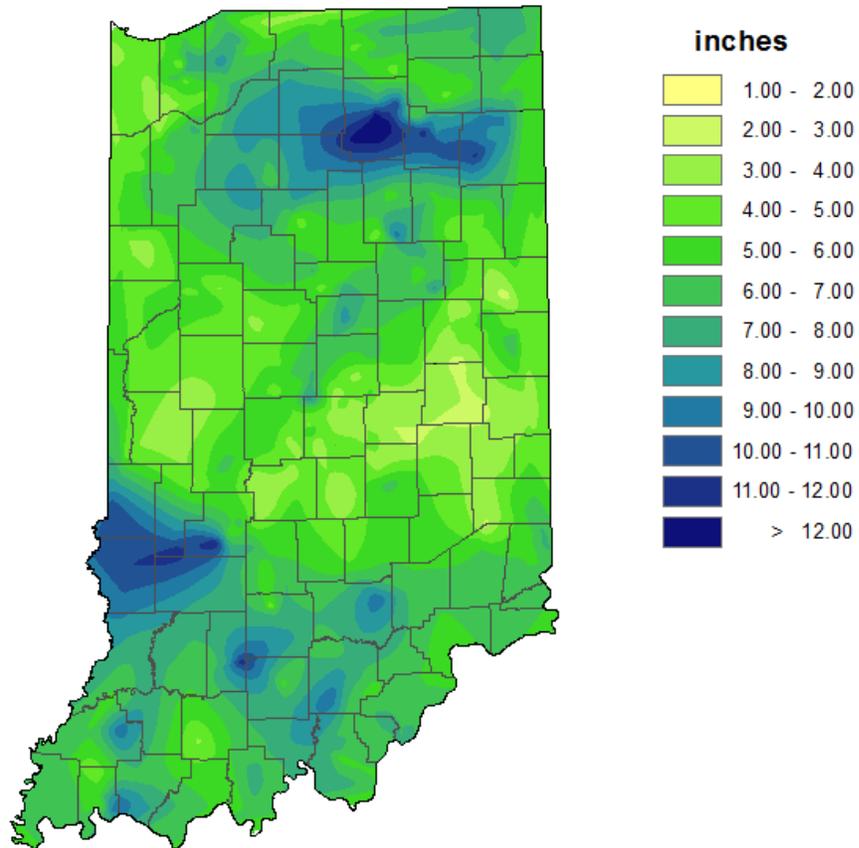
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Central	5.07	4.10	0.97	124
East Central	4.91	4.23	0.68	116
Southwest	7.44	4.10	3.34	181
South Central	7.50	4.09	3.41	184
Southeast	5.74	4.22	1.52	136
State	6.27	4.19	2.08	150

2013 Annual (through June)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	44.4	45.0	-0.6
North Central	44.3	44.6	-0.3
Northeast	44.1	44.2	-0.1
West Central	46.5	46.9	-0.4
Central	46.5	46.5	0.0
East Central	46.1	45.6	0.5
Southwest	49.7	50.5	-0.7
South Central	49.4	50.0	-0.5
Southeast	48.7	49.0	-0.3
State	46.7	47.0	-0.3

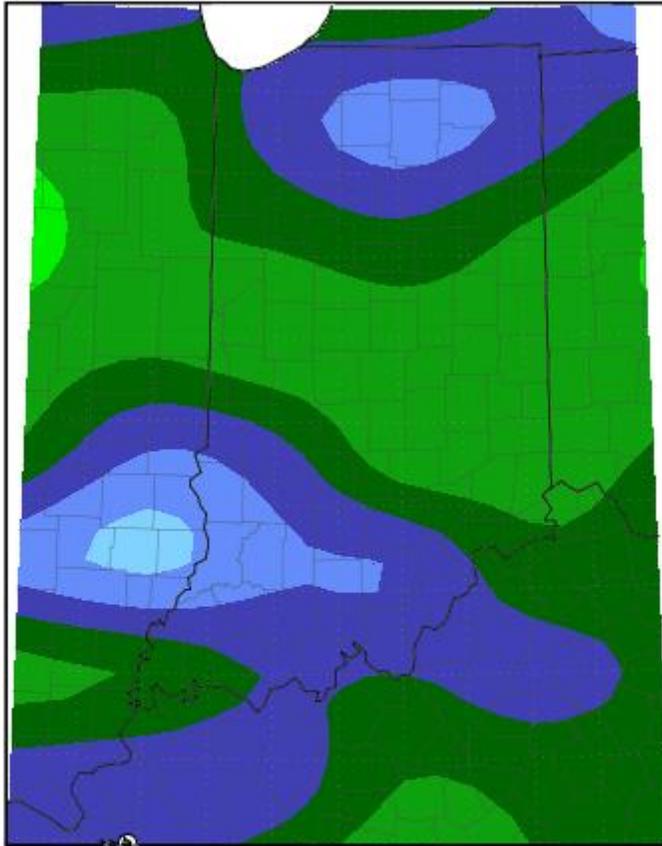
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	24.22	18.39	5.83	132
North Central	25.73	18.37	7.36	140
Northeast	22.88	17.80	5.08	129
West Central	27.27	20.39	6.88	134
Central	26.47	20.30	6.17	130
East Central	22.22	19.83	2.39	112
Southwest	30.17	23.64	6.53	128
South Central	29.04	23.70	5.34	123
Southeast	24.56	23.03	1.53	107
State	26.21	20.65	5.56	127

**Total Precipitation
June 2013
CoCoRaHS network
(416 stations)**

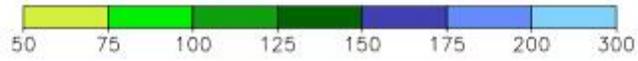


Analysis by Indiana State Climate Office
Web: <http://www.iclimat.org>

Accumulated Precipitation: Percent of Mean
June 1, 2013 to June 30, 2013

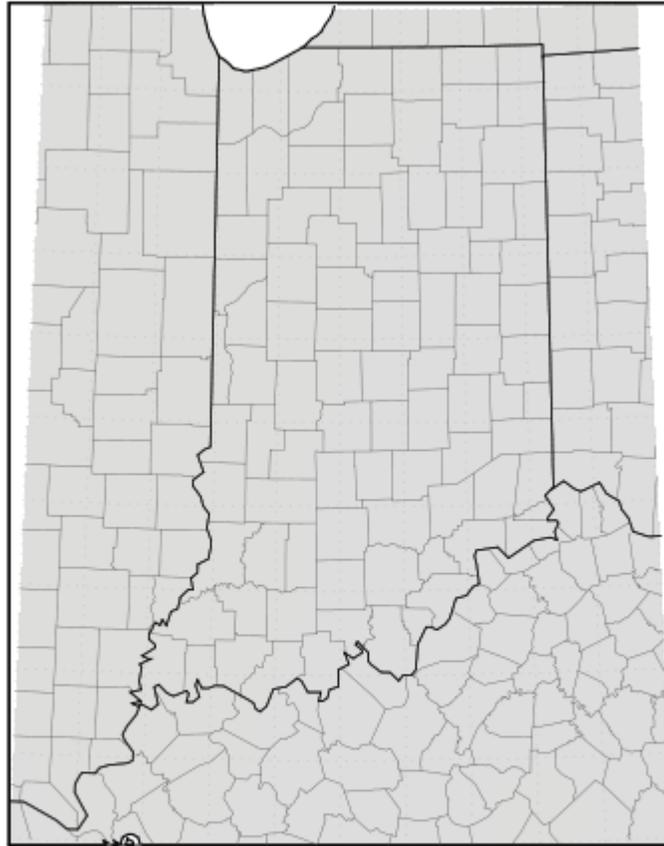


Mean period is 1981-2010.

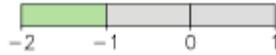


Midwestern Regional Climate Center
MRCC Applied Climate System
Generated at: 7/8/2013 10:04:15 AM CDT

Average Temperature (°F): Departure from Mean
June 1, 2013 to June 30, 2013



Mean period is 1981–2010.



Midwestern Regional Climate Center

MRCC Applied Climate System

Generated at: 7/8/2013 10:04:59 AM CDT

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 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.

There were no drought categories active this month so there are no calculations to be made. The D0 category (abnormally dry) is not a drought category in and of itself.

Indiana ▼

Drought Severity
 D0 - Abnormally Dry
 D1 Drought - Moderate

D2 Drought - Severe
 D3 Drought - Extreme

D4 Drought - Exceptional

Week	Nothing	D0-D4	D1-D4	D2-D4	D3-D4	D4
July 2, 2013	100.00	0.00	0.00	0.00	0.00	0.00
June 25, 2013	100.00	0.00	0.00	0.00	0.00	0.00
June 18, 2013	100.00	0.00	0.00	0.00	0.00	0.00
June 11, 2013	100.00	0.00	0.00	0.00	0.00	0.00
June 4, 2013	100.00	0.00	0.00	0.00	0.00	0.00

June 4th Drought Summary



June 11th Drought Summary



June 18th Drought Summary



June 25th Drought Summary



July 4th Drought Summary

