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And
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Indiana State Climate Office

Monthly Weather Report

Oct 8, 2014



<http://www.inclimate.org>

September 2014 Climate Summary

Month Summary

A two week cold spell in mid-September was sandwiched by warmer than normal temperatures to start and end the month. The stormy pattern of late August ended after September 20th when a rare extended delightful autumn period of warm and dry days finished the month. Severe weather occurred 3 days this month with wind, hail, and flash floods reported. On September 10th motorists trapped on flooded streets required water rescues in central Indiana. There were no reports of tornadoes this month.

The state average temperature of 64.3°F tied 1957 and 1994 as the 37th coolest September on record in Indiana. The temperature deviation was -1.4°F. Some recent cooler Septembers were the 64.2°F average in 2012, 35th coolest on the list, and the 63.6°F reported for both 2001 and 2011 in a tie for 22nd place. In 2003 its 63.4°F average falls into 20th place while 62.5°F in 2006 comes in as 11th coolest on record. The coldest September since 1895 was a chilly 58.0°F average which occurred way back in 1918. The day split in September 2014 had 15 days of below normal temperature, 13 days above normal, and 2 days right at normal. There were 4 days when the daily state temperature average was 10°F or more below normal. The highest temperature of the month in the cooperative network was 95°F on September 6th at both Franklin wwtp and Vincennes 5ne. The coldest temperature was 35°F on September 17th at Laporte.

The September state precipitation average of 3.53 inches is 0.44 inch above normal. This places the month at 50th wettest September on record. Some recent wetter Septembers include a 3.86" average in 2008, ranking as 38th wettest, and 4.10" in 2005, falling into 35th place. In 2006 the 4.56" reading ranks 28th, while 5.18" in 2012 comes in as 14th wettest. The 5.31" value in 2011 is good for 12th place. The wettest September on record was 8.21" in 1926. The highest single day precipitation amount among cooperative stations in September 2014 was 3.79 inches measured at Huntington on September 11th. In the CoCoRaHS network the largest daily total was 5.02 inches on September 6th at Burnettsville 9.9 nnw..

Regionally September 2014 precipitation was about 130% of normal in northern Indiana, 110% of normal in central, and right at normal in the south. Normal September precipitation ranges from 3.1 inches to 4.3 inches. Widespread precipitation fell on about 11 days this month.

September 1st – 6th

The state average temperature was above normal the first 5 days of the new month. Significant rains were noted on September 2nd and 6th while amounts on other days were light to moderate. Thunderstorms on September 5th produced the month's first severe weather event.

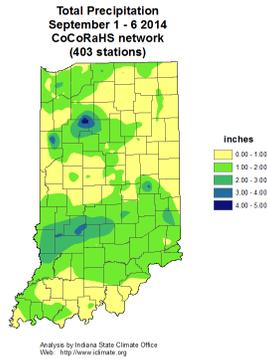
Indiana was located within a warm air mass to start off the month. The daily state average temperature was 6°F above normal. The next day a cold front marched through Iowa and Wisconsin but stalled just short of reaching Indiana. The lifting of the warm air ahead of the front generated cloud cover and heavy rainfall over parts of central and southern Indiana. Thermometers responded by falling a few degrees to a state average 2°F above normal.

On September 3rd weak high pressure from the north nudged the stationary front southward through Indiana to the Ohio River but temperatures held mostly steady. The next day warm air surged northward once again powered by a strong ridge off the Atlantic coast. Indiana temperatures recovered to 6°F above normal. The ridge moved west and inland on September 5th, reinforcing a warm air mass over Indiana. The state temperature climbed to 9°F above normal. An occluded storm system had formed over Ontario, dragging a cold front into northwest Illinois. The cold front barreled through Indiana on September 6th, producing another round of heavy rainfall in northwest counties and drawing in much colder air. The state temperature plummeted to 1°F below normal. Over the 6 day interval the state temperature averaged to 4°F above normal. Typically at the start of September daily maximum temperatures should range from 78°F to 86°F north to south across the state. Daily minimums normally vary between 58°F in far northern Indiana to 62°F in the far southwest corner of the state. The warmest temperature within the cooperative network was 95°F at Franklin wwtp and Vincennes 5ne on September 6th. The coolest reported temperature was 49°F at Warsaw also on September 6th.

More than an inch of rain was reported across southern Indiana on September 2nd. Moderate amounts were noted on September 6th in central Indiana. Rainfall was generally light on the remaining days. Regionally about 0.9 inch of rain was measured across northern Indiana, 1.3 inch in central, and 1.4 inch around southern Indiana these first 6 days of September. These totals equate to about 150% of normal in the north, 250% of normal in central, and 270% of normal rainfall in southern Indiana. Locally heavy rain was observed in central Indiana on September 2nd when two Spencer volunteers in the CoCoRaHS network found 3.55 and 2.84 inches in their rain gages. On the morning of September 6th the Burnettsville gage had 5.02 inches. The Fowler observer measured 3.30 inches while in Monticello 2.95 inches was collected. Over the 6 day interval the Burnettsville total was 5.04 inches while the two Spencer locations tallied 3.59 and 3.14 inches. The New Castle sum was 3.54 inches. In Jasonville 3.13 inches had fallen over the 6 days.

The showdown between the reinforced warm air mass and the occluded storm system on September 5th triggered thunderstorms with hail and wind gusts, especially over northeast Indiana. One inch diameter hail was seen in Marshall, Kosciusko, Lagrange, and Steuben counties. Larger hail at 1.5 inch in diameter was reported in White and Miami counties. Meanwhile wind gusts near 60 mph damaged trees and limbs in Steuben, Noble, Kosciusko, White, and Cass counties. In Madison county wind gusts tore down 15 utility poles. A mobile home was covered by electrical wires. No injuries or deaths occurred during this severe weather event.

According to the September 2nd edition of the US Drought Monitor, abnormally dry areas in extreme northern Indiana are shrinking in coverage. The D0 category areas in St Joseph, Elkhart, and Marshall counties have been eliminated by recent rainfall. About 5% of Indiana land remained in abnormally dry status. Virtually no further improvement took place in the following week according to the September 9th edition of the US Drought Monitor.



September 7th – 13th

Only one low pressure system moved through Indiana this week. A slow warming trend the first half of the week was replaced by a rapid cool down the second half. Heavy rain and severe weather marked the transition between the warm and cold phases. Rainfall was light the remaining days of the week.

A fair weather high pressure ridge was overhead Indiana on September 7th. The state average temperature was 5°F below normal. The ridge expanded in area both north and south of the state the next day. By September 9th the ridge had traveled east of Indiana, allowing southerly winds behind it to transport warmer air into the region. The state temperature had risen slowly day by day to 3°F below normal.

A new storm system had formed in Iowa and by September 10th its warm front was approaching Indiana. The state temperature had finally reached normal, the highest temperature of the week. Severe weather broke out over Indiana that evening as warm air overran the warm front. The low center passed northwest of Indiana on September 11th with its warm front, then its cold front, racing east across the state. The state temperature fell quickly to 8°F below normal. On September 12th and 13th the cold front marched south towards the Gulf of Mexico. Cold Canadian air poured into Indiana to the end of the week. State temperatures plummeted to 13°F below normal, the end of the week being the coldest day.

Despite the early warmup state temperatures remained below normal all week long, averaging to 6°F below normal over the 7 days. Usually for this second week of September daily maximum temperatures should range between 76°F and 84°F north to south across the state. Daily minimums normally vary between 56°F in far northern counties to 59°F in far southwest Indiana. The warmest

temperature of the week was 86°F recorded at Brookville on September 10th and again at Vincennes the next day. The coolest minimum temperature was 39°F on September 13th, recorded at Francesville, West Lafayette 6nw, and Crawfordsville, all stations in the cooperative network.

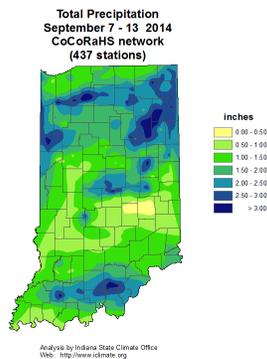
Up to a half inch of rain was common in northern Indiana late on September 10th while many points around Indiana received at least an inch on September 11th. Rainfall was locally heavy at some stations in reports filed on these dates when the fronts moved through the state.

Regionally for the week about 2.1 inches fell across northern Indiana, and near 1.4 inch in central and southern areas. These totals equate to about 250% of normal in the north, and near double normal in central and southern Indiana. Locally heavy rains drenched some communities according to CoCoRaHS reports the morning of September 11th, including 3.50 inches in Earl Park, 3.47 inches at Knox, 3.38 inches in Fort Wayne, 3.33 inches at Huntington, and 3.32 inches in Fredericksburg. Add rainfall received during the other 6 days to come up with these weekly extreme totals: 3.40 inches in Huntington, 3.32 inches at Holland, 3.26 inches in Eaton, and 3.23 inches at Indianapolis 6.8 nne.

Heavy rainfall the evening of September 10th led to flash flooding in Marion county. About 3 inches of rain fell on the northeast side of Indianapolis. About 1000 homes lost power. The Indianapolis Fire Department performed 7 water rescues of drivers trapped in their vehicles on flooded streets.

High wind gusts caused more problems in central Indiana that evening. Fallen trees blocked roads in Hendricks, Morgan, Monroe, Brown, and Switzerland counties. Utility lines were snagged or pulled down causing power outages in Randolph, Morgan, and Brown counties. Field corn was blown down in Hendricks county. In Randolph county some structures were damaged. Winds reached 60 mph in western Indiana where more trees fell in Sullivan and Knox counties.

With all the rainfall recently those areas of northeast Indiana with abnormally dry soils continue to improve according to the September 16th edition of the US Drought Monitor. The D0 rating was removed from most of Noble and DeKalb counties. Dry areas of Indiana continue to disappear week to week.



September 14th – 20th

A slow warm up was underway all week long. Yet it was a cool week as state temperatures remained below normal until breaking through the final day. Weekly rainfall was below normal for the first time since about mid-August. Another round of severe weather hit northern Indiana on September 20th.

September 14th was a cold day with the state temperature near 12° below normal. Fair weather high pressure was overhead Indiana. The high center moved east of the state the next day. Light rain began to fall as the next storm system approached Indiana from the northwest. On September 16th the storm's cold front pushed through the state followed quickly by another high pressure center. Rainfall ended as high pressure moved overhead Indiana the next day. Temperatures nudged barely cooler to 9°F below normal.

On September 18th a second but weak and dry cold front raced across Indiana, pushed hard from behind by a Canadian high pressure center. The cold front dissolved by the next day and the high center moved quickly to New York. Colder air never had a chance to reclaim Indiana. Warmer winds behind the high center kept the Indiana warm up on track to 4°F below normal. The warming continued through September 20th, lifting the state temperature to 1°F above normal to close out the week. The trending but still below normal state temperatures places the week average at 7°F below normal. Typically in this third week daily maximum temperatures should range between 74°F in far northern Indiana to 81°F in the far southwest. Daily minimums normally vary from 53°F to 56°F north to south across the state. The warm spot in the state this week was recorded as 87°F on September 20th by the cooperative station at Boonville. The coldest temperature was noted as 35°F on September 17th at La Porte.

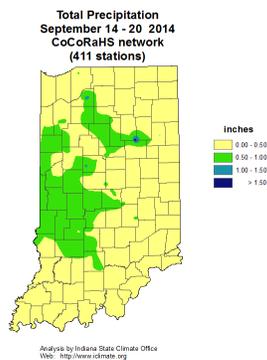
Rain fell early and at the end of the week with passage of the two cold fronts. On the large scale weekly totals in northern and central Indiana were near 0.4 inch while about half that amount fell in the south, at 0.2 inch. These amounts equate to about 50% of normal in northern Indiana, 60% in central, and just 30% of normal across the south. Locally heavier amounts fell as recorded the mornings of September 16th and 20th but were not as extreme as have been noted in recent months. In the first event the CocoRaHS observer at Knox measured 1.15 inch, while Bedford had 0.94 inch and Bloomfield 0.93 inch. In the September 20th event LaFontaine recorded 1.30 inch. The rain gage at Hebron caught 1.17 inch. Over the full week the LaFontaine CoCoRaHS observer collected 1.97 inch. The Kentland observer tallied 0.72 inch and Spencer summed up 0.68 inch. The Trail Creek volunteer accumulated 0.67 inch while Brownsburg had 0.66 inch.

Severe weather occurred the afternoon and evening of September 20th. Damage reports were filed by 11 counties. The primary cause of damage was wind gusts, mostly in the northern two tiers of Indiana counties. Falling trees were the main casualty as expected but fortunately no injuries were reported.

In Lake county 70 mph wind gusts tore down power lines and poles. In Porter county wind gusts from 62 to 79 mph were recorded. Trees were blown over, with some ripping down traffic signals. Trees fell on cars, homes, and utility poles, leaving about 11,000 buildings without power. State highways were blocked by trees and power lines. A lightning strike started an attic fire.

In Starke county an uprooted tree ruptured a gas line, forcing the evacuation of 3 homes. Tree branches covered many vehicles due to the 70 mph gusts. Trees fell on Marshall county roads with still more trees down in St Joseph county. In Elkhart county trees snagged power lines which toppled on to state highways. In Noble county trees fell on a home while a tree was reported down in Lagrange county. Wind gusts in the Jasper county area were reported to 70 mph and to 60 mph in Whitley county.

The remaining parts of Indiana with abnormally dry soils is slowly disappearing week by week. On September 16th all of Steuben county and most of Lagrange county was rated in the D0 category according to the US Drought Monitor. Only small parts of DeKalb, Noble, and Elkhart counties also remain in the D0 classification. There was no change a week later. The September 23rd Indiana drought map was identical to the September 16th map. The coverage of area in the D0 category in both maps is less than 3% of total Indiana land area.



September 21st – 30th

Weather in the final 10 days of September was as near perfect as can be expected this time of year in Indiana. A long stretch of rain free days with temperatures averaging through the 60's F was delightful and helpful to farmers during harvest season. There was no severe weather reported over the interval.

Two cold fronts rushed through Indiana on September 21st. The fronts would mark the last storm system to move through Indiana over the next 9 days. Temperatures had started the interval at nearly 2°F above normal but fell to 4°F below normal by the next day. Skies cleared as cooler air entered the state on the front side of an Iowa high pressure center. This high pressure lie overhead the state on September 23rd. A gradual warming trend would now take over for essentially the rest of the month.

The high pressure ridge drifted east to New England on September 24th. Warm winds behind the center picked up Indiana temperature to 2°F above normal. The next day the New England ridge expanded westward, again dominating Indiana and Midwest states, insuring the pleasant and dry

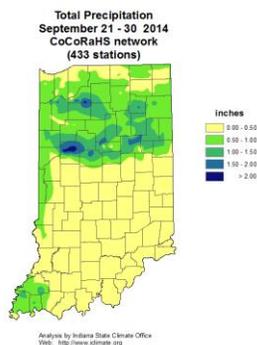
weather would continue. The now Midwest ridge continued to grow stronger, its center retrograding west toward Detroit, and covering the eastern two-thirds of the country by September 26th. Indiana temperatures were now at 4°F above normal. The strength of the ridge peaked the next day.

On September 28th the west edge of the ridge began to weaken as a Canadian cold front entered the Dakotas. Indiana temperature peaked that day at 6°F above normal. On September 29th the Canadian front advanced into Wisconsin and Michigan and the Midwest ridge began to shrink and sink south of Indiana. The state temperature didn't fall much the first day, setting at 5°F above normal.

The new wave of cold air pushed the Michigan front south through Indiana on September 30th. The state temperature plunged to settle at normal to close the month. The 10 day stretch of ideal early autumn weather in Indiana was now ended. But the daily state temperature held above normal most of the time in these last 10 days, and averaged 2°F above normal. Typically the month wraps up with the daily maximum temperature ranging between 70°F and 77°F north to south across the state. The daily minimum normally varies from 50°F in far northern counties to 52°F in the far southwest. The highest temperature observed in the cooperative network over the 10 days was 90°F at the Evansville Museum on September 28th. The coolest cooperative network temperature was 38°F at Lafayette on September 23rd and again at Terre Haute the next day.

Rain fell during the passage of the two cold fronts on September 21st but was virtually absent to the end of the month. Regional totals were near 0.7 inch in northern Indiana, 0.3 inch in central counties, and just 0.1 inch across the south in the 10 days. These amounts equate to about 70% of normal in the north, 30% of normal in central Indiana, and less than 10% of normal in the southern third of the state. There were some locally heavy shower amounts reported the morning of September 21st. A Lafayette CoCoRaHS observer collected 2.51 inches by that morning while in West Lafayette 2.40 inches was measured. To the north in Starke county the Monterey observer noted 2.25 inches while in North Judson 1.98 inches was caught. Van Buren reported 1.96 inch. Barely any rain fell anywhere the rest of the month so these numbers closely match the 10 day totals.

There was no change in the Indiana status of soil moisture as described a week ago by the US Drought Monitor.



September 2014

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	62.6	64.6	-2.0
North Central	62.3	63.9	-1.6
Northeast	62.1	63.5	-1.5
West Central	63.9	65.9	-2.0
Central	64.2	65.3	-1.1
East Central	63.5	64.5	-1.0
Southwest	66.9	68.2	-1.3
South Central	66.5	67.5	-1.0
Southeast	66.1	66.9	-0.8
State	64.3	65.7	-1.4

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	4.28	3.21	1.07	133
North Central	3.92	3.30	0.62	119
Northeast	4.34	3.19	1.15	136
West Central	3.40	3.03	0.37	112
Central	3.53	2.99	0.55	118
East Central	2.80	2.79	0.01	100
Southwest	3.09	3.13	-0.05	98
South Central	3.28	3.11	0.17	105
Southeast	2.81	2.97	-0.16	95
State	3.53	3.09	0.44	114

Autumn so far (same as September)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	62.6	64.6	-2.0
North Central	62.3	63.9	-1.6
Northeast	62.1	63.5	-1.5
West Central	63.9	65.9	-2.0
Central	64.2	65.3	-1.1
East Central	63.5	64.5	-1.0
Southwest	66.9	68.2	-1.3
South Central	66.5	67.5	-1.0
Southeast	66.1	66.9	-0.8
State	64.3	65.7	-1.4

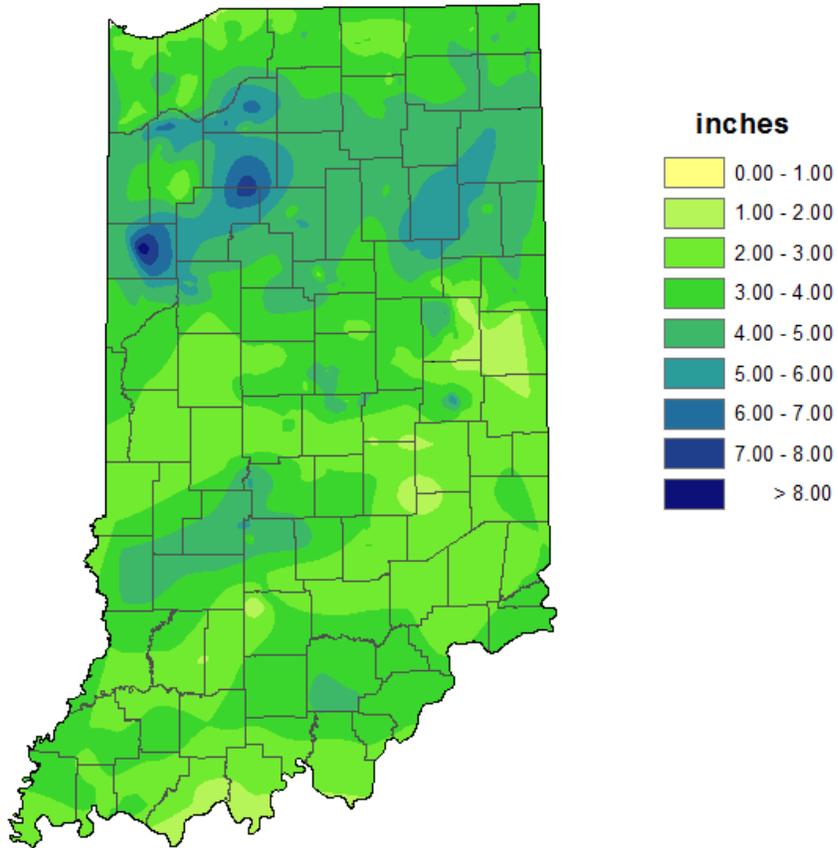
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	4.28	3.21	1.07	133
North Central	3.92	3.30	0.62	119
Northeast	4.34	3.19	1.15	136
West Central	3.40	3.03	0.37	112
Central	3.53	2.99	0.55	118
East Central	2.80	2.79	0.01	100
Southwest	3.09	3.13	-0.05	98
South Central	3.28	3.11	0.17	105
Southeast	2.81	2.97	-0.16	95
State	3.53	3.09	0.44	114

2014 Annual so far

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	49.7	53.5	-3.7
North Central	49.5	53.0	-3.5
Northeast	49.2	52.6	-3.4
West Central	52.2	55.1	-2.9
Central	52.4	54.6	-2.2
East Central	51.7	53.8	-2.1
Southwest	56.1	58.3	-2.1
South Central	55.8	57.7	-1.9
Southeast	54.9	56.8	-1.9
State	52.5	55.1	-2.6

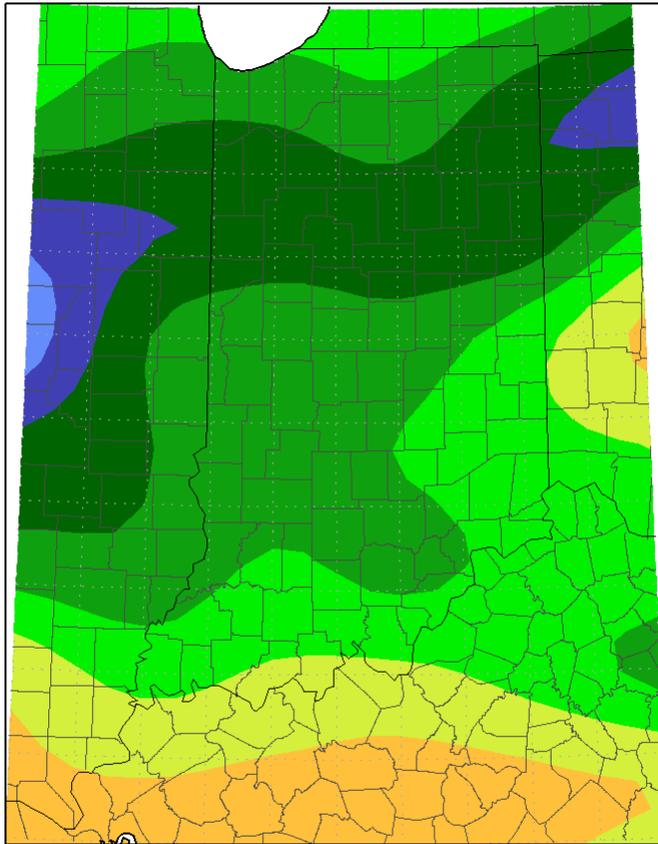
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	36.15	29.28	6.87	123
North Central	31.58	29.30	2.28	108
Northeast	29.37	28.34	1.03	104
West Central	32.53	31.77	0.76	102
Central	34.15	31.30	2.85	109
East Central	33.15	30.27	2.88	110
Southwest	36.89	34.71	2.18	106
South Central	39.42	35.04	4.38	113
Southeast	34.57	34.02	0.54	102
State	34.36	31.63	2.73	109

**Total Precipitation
September 2014
CoCoRaHS network
(430 stations)**

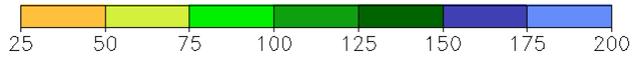


Analysis by Indiana State Climate Office
Web: <http://www.iclimate.org>

Accumulated Precipitation: Percent of Mean
September 1, 2014 to September 30, 2014

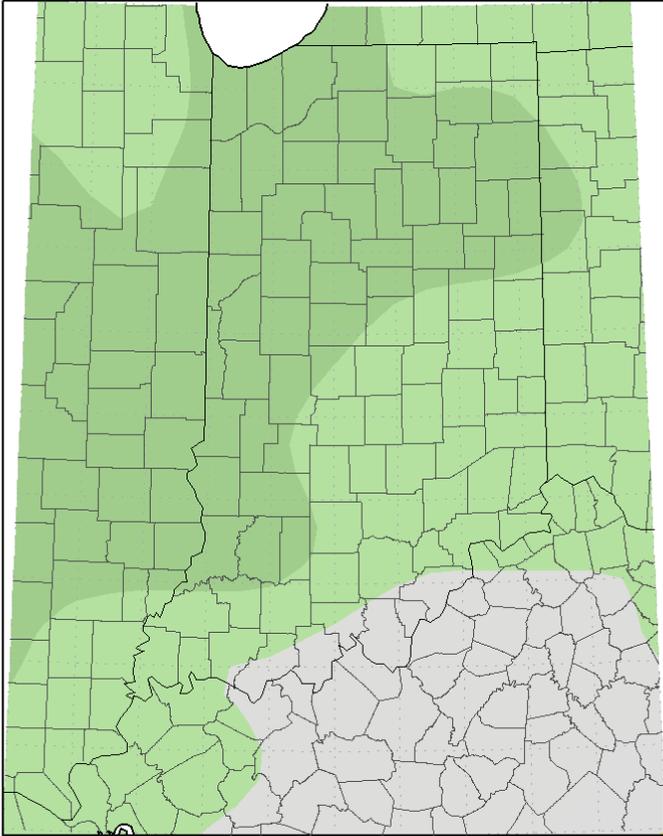


Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 10/8/2014 2:15:35 PM CDT

Average Temperature (°F): Departure from Mean
September 1, 2014 to September 30, 2014



Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
Generated at: 10/8/2014 2:16:19 PM 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 what percentage of the state is drought free, and how much of the state is in drought by degree of severity (D1 - D4 category).

Indiana

Drought Severity

D0 - Abnormally Dry

D2 Drought - Severe

D4 Drought - Exceptional

D1 Drought - Moderate

D3 Drought - Extreme

Statistics type: Traditional (D0-D4, D1-D4, etc.) Categorical (D0, D1, etc.)

Percent Area in U.S. Drought Monitor Categories

Week	None	D0	D1	D2	D3	D4
2014-09-30	97.18	2.82	0.00	0.00	0.00	0.00
2014-09-23	97.18	2.82	0.00	0.00	0.00	0.00
2014-09-16	97.18	2.82	0.00	0.00	0.00	0.00
2014-09-09	95.08	4.92	0.00	0.00	0.00	0.00
2014-09-02	95.49	4.51	0.00	0.00	0.00	0.00

September 2nd Drought Summary



September 9^h Drought Summary



September 16th Drought Summary



September 23rd Drought Summary



September 30th Drought Summary

