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And
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Indiana State Climate Office

Monthly Weather Report

Nov 10, 2014



<http://www.inclimate.org>

October 2014 Climate Summary

Month Summary

October featured a mix of weather. A very wet first half of the month evolved into a drier second half. Temperatures swung warm and cold all month long. Add in two confirmed tornadoes, the last remnants of a Pacific hurricane, a blustery shore damaging Halloween storm, and a taste of snow to make this October all the more interesting.

The state average temperature was 53.8°F, very close to the normal October temperature. The temperature deviation was just -0.2 °F. The day split in October 2014 had 14 days of below normal temperature, 14 days above normal, and 3 days right at normal. There were 2 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 89°F which occurred on October 2nd in Evansville and the next day at Vincennes 5ne. The coldest temperature was 26°F on October 24th at Angola.

The October state precipitation average of 4.14" is 1.24" above normal. This ties 1911 and 2004 as the 21st wettest October on record. Some recent wetter Octobers include a 5.01" average in 2006, ranking as 9th wettest, a 6.69" value in 2009 in 3rd place, and 7.75" in 2001, good for 2nd place. The wettest October on record was 8.17" in 1919. The highest single day precipitation amount among cooperative stations in October 2014 was 3.65", measured at Graysville 5wnw on October 3rd. In the CoCoRaHS network the largest daily total was 3.57" that same day at Hanna 1.1e.

Regionally October 2014 precipitation was about 120% of normal in northern Indiana, 140% of normal in central areas, and 160% of normal in the south. Normal October precipitation ranges from 2.7" in northeast Indiana to 3.0" in southwest Indiana. It rained often. Widespread precipitation fell on a whopping 20 days this month.

An EF-0 tornado touched down in Putnam county on October 7th and an EF-1 in Posey county on October 13th. Whiting Lakefront Park experienced costly damage due to high waves and wind gusts off Lake Michigan on October 31st. The remnants of Hurricane Simon merged with a Midwest storm to prolong the misery of consecutive days of light rain and drizzle in the middle of the month.

October 1st – 7th

After a gorgeous end to September our weather pattern returned to its old ways of cool temperatures and local downpours to start off October. Rain fell somewhere in Indiana every day with the heaviest amounts early in the week. Severe weather occurred on October 3rd, 6th, and 7th. A confirmed tornado touched down in Putnam county on October 7th with scattered hail and wind damage elsewhere across the state.

The state average temperature opened at 1°F above normal as a stationary front lie to the south of Indiana on October 1st. The next day high pressure over Quebec sprawled south to Virginia, dissolving the stationary front, and setting up a warm air backflow into Indiana. The state temperature surged to 6°F above normal, the warmest day of the week. A well-organized Missouri low pressure system pulled north to Lake Superior on October 3rd. Three fronts attached to this low system, first a warm front then two cold fronts pushed through Indiana quickly in sequence, initially dropping temperatures to 4°F above normal.

The Lake Superior storm raced to New Jersey on October 4th but had already opened the refrigerator door. A strong flow of cold Canadian air rushed into Indiana, forcing the state temperature downward to 12°F below normal, the coldest day of the week. By October 5th the old cold fronts were far out into the Atlantic and high pressure in southern states was already pumping warmer air back to Indiana. The state temperature rebounded to 8°F below normal, then to 3°F below normal by October 6th. A new much weaker storm system had formed and reached Illinois. High pressure had taken hold off the Atlantic coast and blocked the Illinois system, forcing it into retreat. As this took place severe weather broke out across Indiana. The state temperature lifted a bit more, ending the week right at the normal mark. Normal daily maximum temperature this first week of October ranges from 66°F in far northern Indiana to 74°F in the far southwest corner of the state. Daily minimums vary between 46°F and 49°F north to south across the state. The warmest maximum temperature this week in the cooperative network was 89°F at Evansville on October 2nd. The coolest minimum among cooperative stations was 32°F at Shoals on October 5th.

The heaviest rainfall of the week came with the passage of the two cold fronts. Amounts measured the morning of October 3rd averaged about 1.2 inch in northern Indiana, 0.8 inch in central, and 0.5 inch across the south. Typically a quarter inch or less fell on the remaining days. For the week northern Indiana averaged 1.8 inch, central had 1.4 inch, and 1.2 inch covered the south. These totals equate to about 230% of normal in northern Indiana, 170% of normal in central areas, and 150% of normal across the south. The week rainfall pattern is best seen on the map below this narrative, which shows the northwest half of the state received the bulk of the rainfall, up to 7 inches, while the southeast half noted an inch or less.

Locally heavy rain was recorded the morning of October 3rd. The CoCoRaHS observer in West Terre Haute collected 5.45 inches while the Clinton volunteer tallied 4.03 inches. The Hanna rain gage had 3.57 inches. Further north the Wheatfield observer had 3.53 inches while in South Bend 3.41 inches had fallen. Some of the heavier week totals included two Granger reports of 4.31 and 4.00 inch totals. Russellville noted 3.88 inches while both Wanatah and Mishawaka had 3.35 inches.

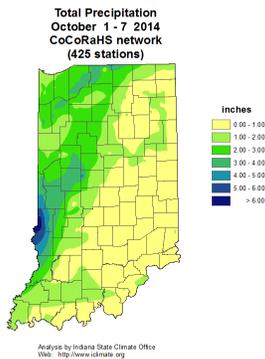
There was only a single severe weather report on October 3rd in which a tree fell on a Knox county road in 50 mph winds.

On October 6th another report of a tree toppled by wind gusts and blocking a road came from Knox county. In the southeast corner of the state, one inch diameter hail was reported from each of the 3 neighboring counties of Harrison, Floyd, and Clark.

The intensity of severe weather picked up on October 7th. A confirmed EF-0 tornado with 70 mph winds touched down in rural Putnam county, causing minor tree damage and twirling corn stalks into the air. The path was very brief, just 0.1 mile long.

In Huntington county winds picked up and threw roof sheet metal and scattered building insulation around. One inch diameter hail fell in this county as well as in the neighboring counties of Wabash and Fulton. Larger hail up to 1.25 inch was also seen in Fulton county. In southern Indiana one inch hail was observed in Daviess, Martin, Pike, and Clark counties. Winds to 60 mph tore down a tree in Clark county. Hail was not large in Gibson county but so much of it fell that residents had to use snow shovels to clear it from their driveways.

Again there was no change in the status of Indiana soil moisture according to the October 7th US Drought Monitor. Only about 3% of Indiana land area, all in the extreme northeast corner of the state, remains in the D0 category known as abnormally dry.



October 8th – 14th

The northern third of Indiana experienced its first autumn freeze this week. The remnants of a Pacific hurricane wrapped into an approaching Midwest storm system near the end of the week to generate a tornado and wind damage in southwest Indiana. Rain fell often during the week and, with support from the hurricane remnants, generous amounts were dumped on southern Indiana.

A wedge of high pressure slipped southeast towards Indiana around a strong Canadian storm on October 8th. The weak ridge parked overhead the state through October 10th, steady state average temperatures at 3°F to 4°F below normal. High pressure reinforcement arrived in Indiana on October 11th, pushing a stationary front still further south and away from the state. Skies cleared overnight and with calm winds, autumn's first freeze covered the northern third of Indiana the

morning of October 12th. Later in the day high pressure moved on to our eastern states and a rapid Indiana warm up began.

Back on October 8th the remnants of Hurricane Simon had made landfall in Baja California, Mexico. It traveled east to New Mexico, then to Texas and Louisiana. On October 12th the remnants of Simon became entangled with a developing storm over South Dakota. The systems merged and greatly intensified vertically through the atmosphere as a single storm over Oklahoma.

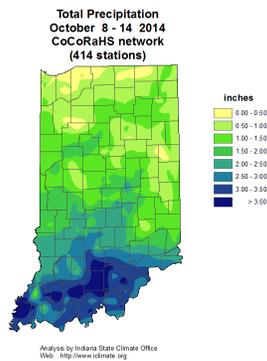
On October 13th a tongue of unstable warm air surged northward into Indiana as a warm front from the Oklahoma storm. The instability led to the formation of an EF-1 tornado in Posey county with pockets of wind damage elsewhere in southwest Indiana. The state temperature had risen from 2°F below normal the previous day to 5°F above normal. On October 14th the storm center pushed northeast from Oklahoma to Illinois. Indiana remained in the warm sector most of that day as the state temperature continued its climb to 9°F above normal. Late that day the cold front of this intense storm system passed through Indiana to close out the week.

The cool start balanced the warmth late in the week. The weekly state temperature averaged right to normal. Usually in this second week of October daily maximum temperatures should range between 64°F in far northern Indiana to 72°F in the far southwest corner of the state. Normal daily minimums vary between 44°F and 47°F north to south across the state. The warmest local daily maximum temperature this week in the cooperative station reporting network was 83°F at Vincennes 5 ne on October 14th. The coolest reading was a 29°F reading at Angola on October 12th.

It was a rainy week with light to moderate rainfall each day. The heavier rain came late in the week with the merged storm system. Regionally about 0.8 inch fell across northern Indiana, 1.4 inch in central counties, and about 2.6 inches in the south. These totals equate to about 140% of normal in the north, 250% of normal across central Indiana, and 410% of normal in the southern third of the state. The heaviest daily amounts were recorded the morning of October 14th. In the CoCoRaHS network the observer in English measured 2.52 inches while at Tell City 2.35 inches was captured. The Cannelton volunteer had 2.10 inches while at Leopold 2.08 inches was noted. Mitchell had 1.95 inches for the day. In total for the week the Mitchell reporter had 4.31 inches, Celestine 4.03 inches, and Milltown had 3.95 inches. The Medora volunteer had collected 3.77 inches for the week while at Leopold 3.71 inches was tallied.

An EF-1 tornado on October 13th was confirmed in Posey county near New Harmony. Winds peaked at near 100 mph as the tornado traveled 5 miles on the ground. Fortunately there were no deaths, injuries, or reports of substantial damage. Isolated pockets of wind gust damage were reported in other southwest counties. A tree fell across a state highway in Knox county while power lines were ripped down in Lawrence county. Wind gusts up to 60 mph were reported there as well as in Vanderburgh county.

There was no reported change in soil moisture status this week. According to the US Drought Monitor soils in parts of 5 counties in extreme northeast Indiana continue in abnormally dry status, also known as category D0. This area includes less than 3% of total state land area. All other areas of the state are still rated in normal soil moisture status for this time of year.



October 15th – 21st

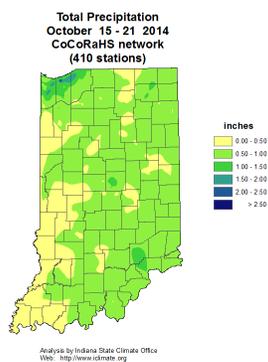
Temperatures trended slightly warmer than normal this week. Rain and drizzle persisted early on in a circular shower pattern as the embedded remnants of a Pacific hurricane tracked very slowly east over Indiana. There were no severe weather events in the state this week.

An intense closed low pressure system cutting vertically through all levels of the troposphere was centered over Indiana on October 15th. Such systems move very slowly and can produce multiple days of light rain or drizzle under cloudy skies. Showers often travel in a circular pattern in these systems and rains repeat over the same areas. By the end of October 16th there were signs this system was finally moving on and leaving the state. Daily state average temperatures had not wavered much under cloudy skies, rising to just 1°F above normal after starting the week right at normal.

The circular storm had moved on but a new storm system in the Dakotas rushed eastward to Indiana on October 17th. A warm front briefly moved through southern Indiana that morning but a few hours later a cold front had crossed the entire state. The daily state temperature had peaked briefly at 5°F above normal. High pressure transported colder air due south from Canada behind a second cold front that moved through Indiana early on October 18th. The state temperature continued to fall to 1°F below normal. This Canadian ridge pushed further south the next day and moved overhead Indiana. The state temperature had now dipped to 2°F below normal. The ridge moved southeast of the state on October 20th. This set up the brief return of warmer air to Indiana and lifted the state average temperature to 3°F above normal. A slowing weak cold front the next day stalled along the Ohio River after passing through the state. The state temperature fell a few degrees to end the week at 1°F above normal. All the minor temperature swings averaged to a weekly state temperature near 1°F above normal. Usually at this time in October daily maximum temperatures should vary between 61°F and 69°F north to south across Indiana. Daily minimums normally range between 42°F near the Michigan border to 45°F in the far southwest corner of the state. The warmest local daily temperature in the cooperative network this week was 75°F at Mount Vernon on October 18th. The coolest local minimum temperature was 29°F at Angola and Garrett on October 20th.

Rain fell daily again this week but amounts were mostly light once the closed low pressure system left the state after October 16th. The heaviest rain had been recorded on October 15th and 16th. Weekly totals were fairly uniform statewide at about 0.6 inch. This equates to about 90% of normal in northern and central Indiana and 70% of normal across the south. The heaviest local showers all occurred in northwest Indiana this week. On the morning of October 15th the CoCoRaHS observer in Dyer noted 1.15 inch. The Lowell volunteer measured 1.14 inch while in Portage 1.10 inch was recorded. The heaviest weekly totals were also in northwest Indiana. Michigan City tallied 1.91 inch while Chesterton had 1.90 inch and Hobart collected 1.86 inch. The Crown Point gage summed to 1.68 inch and a Valparaiso observer noted 1.60 inch for the week.

According to the US Drought Monitor there was again no significant change in soil moisture status around the state. Parts of 5 counties in extreme northeast Indiana remain classified as abnormally dry while elsewhere soil moisture is in normal October status.



October 22nd – 31st

Three storm systems moved through Indiana in the final 10 days of October, each stronger than the one before it. Temperatures in the interval started cool, then warmed for several days before falling sharply near the end of the month. A drier trend which began about October 16th continued. Halloween was blustery with storm damage along the Lake Michigan shoreline.

High pressure was overhead the state on October 22nd and 23rd, wrapping around the backside of a New England nor'easter. State average temperatures held at near 5°F below normal. On October 24th a broad warm front pushed through the Midwest, opening a gateway to much warmer air from our southern states. The state temperature soared to 8°F above normal. Over the next two days a weak cold front crossed Indiana but stalled in Tennessee. Temperatures fell a few degrees for just one day.

A new storm formed over Iowa on October 27th. Its warm front lifted north through Indiana, restoring the state average temperature to 9°F above normal. The cold front side of this storm

muscled through the state on October 28th, delivering much colder air to Indiana the next day. The state temperature plummeted to 3°F below normal. A ridge of high pressure behind the front pumped colder air into the state as temperatures continued falling to 6°F below normal. A reinforcement of the cold air arrived as a blustery cold front crossed the state on Halloween. Temperatures dropped to 12°F below normal, the coldest day of the month.

Over these 10 days the state temperature had ranged both well above and below normal, balancing the interval to near normal temperature. Typically over the last 10 days of October daily maximum temperatures should vary between 58°F in far northern Indiana to 66°F in the southwest corner. Normal daily minimums range between 40°F and 43°F north to south across the state. The warmest local daily temperature among cooperative weather stations over this time was 89°F at Evansville Museum and Evansville Airport on October 2nd and at Vincennes 5ne on October 3rd. The coldest local minimum temperature was 26°F at Angola on October 24th.

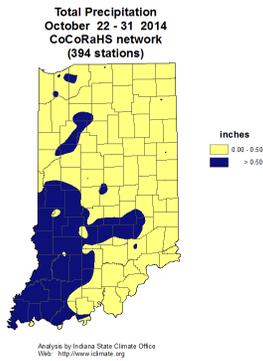
After heavy local rainfall events the past few months a drier trend may be on the way. There were 4 days out of 10 with no rainfall and a few others with very light amounts. The 10 day sum was about 0.3 inch across northern Indiana, 0.4 inch in central, and about 0.5 inch around the south. These totals equate to about 40% of normal in the north, 60% in central counties, and 70% of normal in the southern third of the state. The heaviest daily local amounts in the CoCoRaHS network were in southwest Indiana with 1.07 inch at Bloomfield and 1.00 inch in Petersburg reported the morning of October 29th. On the previous day Waldron had 0.93 inch while Hazleton had 0.89 inch. Hebron had 0.83 inch on Halloween. Over the entire ten days the Hazleton and Petersburg precipitation summed to 1.03 inch. Washington tallied 0.88 inch, Reelsville had 0.86 inch, and Taylorsville collected 0.80 inch.

The CoCoRaHS station at Hebron in Porter county noted the first snowfall of the season in Indiana with a report of 0.5 inch in its October 31st morning report. Several places in northern and central Indiana saw mixed rain and snow in the air at times that day.

North winds out of the October 31st storm roared down the length of Lake Michigan. Gusts up to 70 mph created waves more than 20 feet tall which pounded the south shore. The Whiting Lakefront Park suffered significant damage while the Indiana Dunes State Park and Dunes National Lakeshore in Porter county experienced light damage with some shore erosion.

In Whiting Lakefront Park armor stones weighing up to 10 tons were moved and washed into the lake. Concrete was buckled along the boardwalk while concrete along the pier was sunken. A light pole was bent, 14 trees were uprooted, and the park was flooded, forcing its closure for several days.

The US Drought Monitor again reported no change in the drought status of Indiana soils. Parts of 5 counties in extreme northeast Indiana remain classified as abnormally dry while elsewhere soil moisture is in normal October status. There has been no status change since the September 16th edition of the US Drought Monitor. No further updates will be posted here until a change does occur.



October 2014

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	51.5	52.9	-1.4
North Central	51.5	52.2	-0.7
Northeast	51.1	51.8	-0.7
West Central	53.3	54.1	-0.8
Central	53.7	53.5	0.2
East Central	53.0	52.7	0.3
Southwest	57.1	56.7	0.4
South Central	56.3	56.0	0.3
Southeast	55.4	55.2	0.2
State	53.8	54.0	-0.2

Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	4.19	2.92	1.27	143
North Central	3.58	2.95	0.63	121
Northeast	2.89	2.70	0.19	107
West Central	5.11	2.90	2.21	176
Central	3.65	2.82	0.82	129
East Central	2.70	2.73	-0.03	99
Southwest	5.18	3.04	2.13	170
South Central	5.24	3.02	2.22	174
Southeast	4.07	2.98	1.09	136
State	4.14	2.90	1.24	143

Autumn so far (September - October)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	56.9	58.6	-1.7
North Central	56.8	58.0	-1.2
Northeast	56.4	57.6	-1.2
West Central	58.5	59.9	-1.4
Central	58.8	59.3	-0.4
East Central	58.1	58.5	-0.4
Southwest	61.9	62.4	-0.4
South Central	61.3	61.6	-0.3
Southeast	60.7	60.9	-0.3
State	58.9	59.7	-0.8

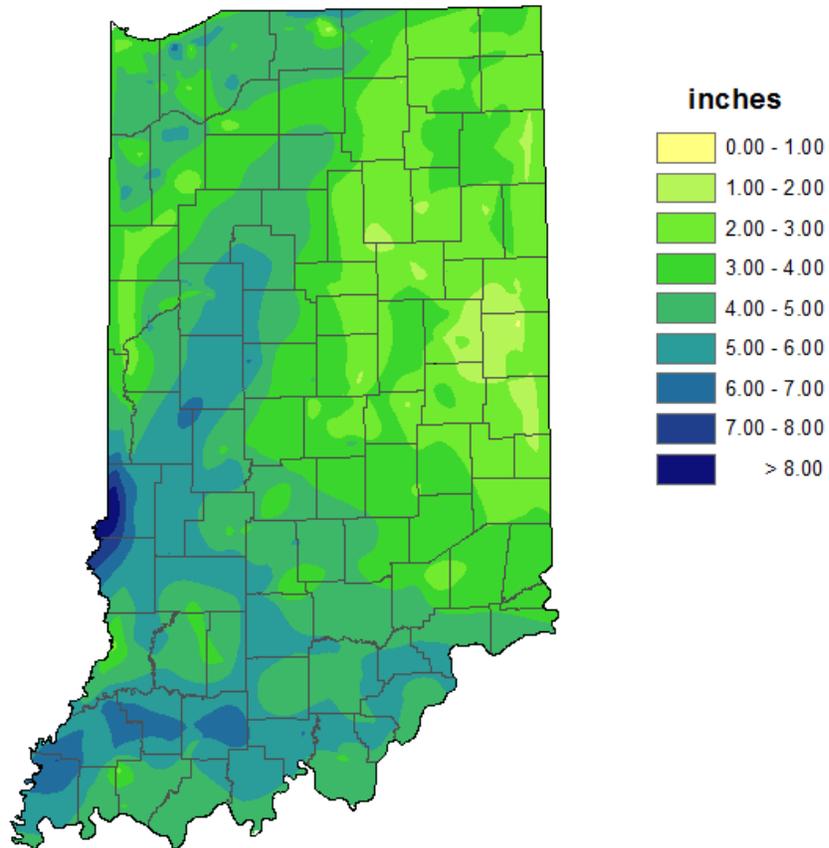
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	8.41	6.13	2.28	137
North Central	7.43	6.25	1.18	119
Northeast	7.22	5.90	1.32	122
West Central	8.46	5.93	2.53	143
Central	7.14	5.81	1.33	123
East Central	5.42	5.52	-0.10	98
Southwest	8.25	6.18	2.07	133
South Central	8.49	6.13	2.37	139
Southeast	6.89	5.95	0.93	116
State	7.63	5.99	1.64	127

2014 Annual so far

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	49.9	53.4	-3.5
North Central	49.7	52.9	-3.2
Northeast	49.4	52.5	-3.1
West Central	52.3	55.0	-2.7
Central	52.5	54.5	-2.0
East Central	51.8	53.7	-1.9
Southwest	56.2	58.1	-1.9
South Central	55.8	57.5	-1.6
Southeast	55.0	56.6	-1.7
State	52.6	55.0	-2.4

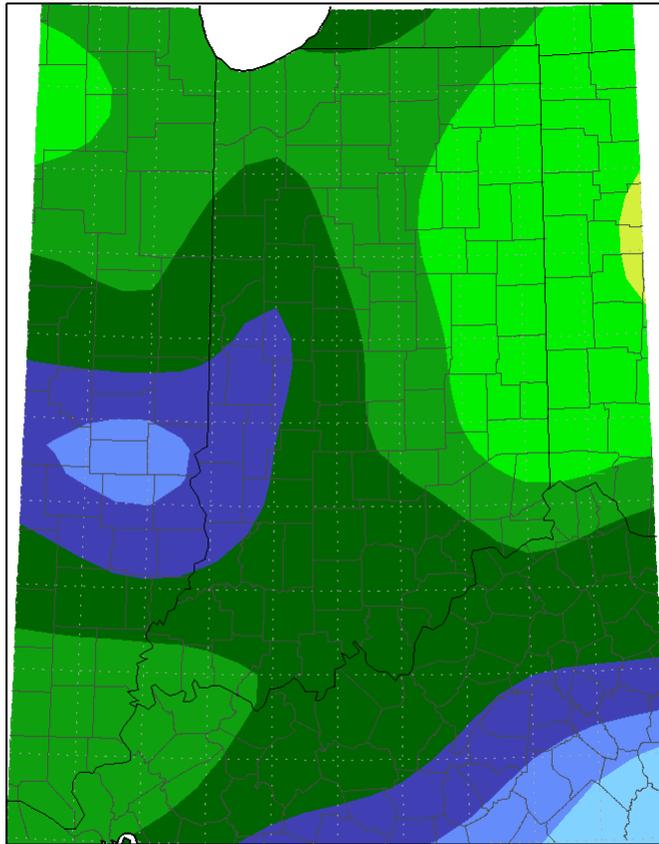
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	40.28	32.20	8.08	125
North Central	35.10	32.25	2.85	109
Northeast	32.25	31.04	1.21	104
West Central	37.59	34.67	2.92	108
Central	37.75	34.12	3.63	111
East Central	35.78	33.00	2.77	108
Southwest	42.04	37.75	4.29	111
South Central	44.63	38.06	6.58	117
Southeast	38.64	37.01	1.63	104
State	38.47	34.53	3.94	111

**Total Precipitation
October 2014
CoCoRaHS network
(441 stations)**

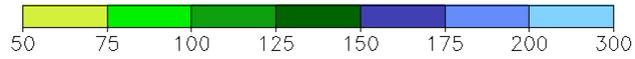


Analysis by Indiana State Climate Office
Web: <http://www.iclimat.org>

Accumulated Precipitation: Percent of Mean
October 1, 2014 to October 31, 2014

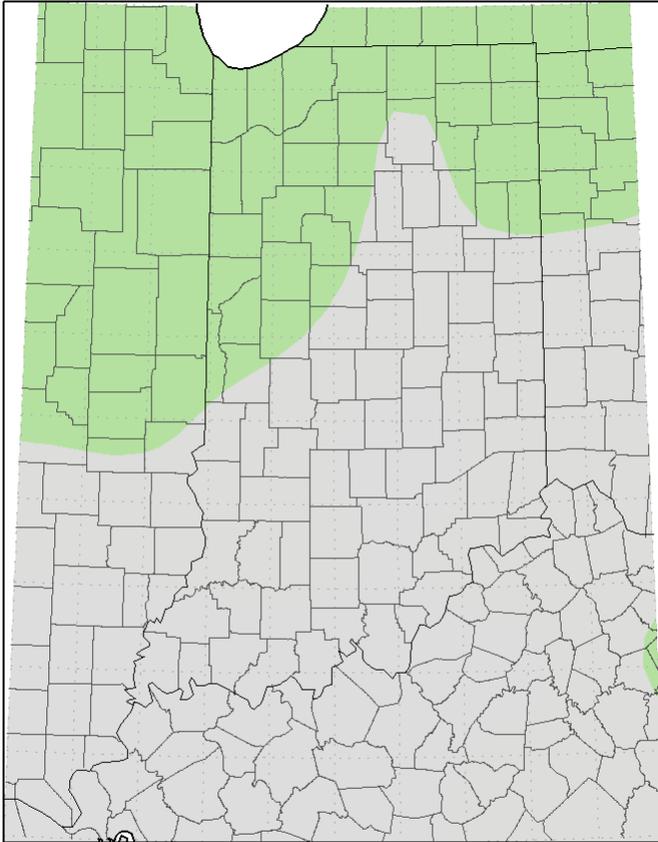


Mean period is 1981-2010.

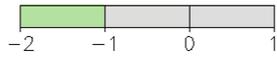


Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
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Average Temperature (°F): Departure from Mean
October 1, 2014 to October 31, 2014



Mean period is 1981-2010.



Midwestern Regional Climate Center
cli-MATE: MRCC Application Tools Environment
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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

Popu

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

Percent Area in U.S. Drought Monitor Categories

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
2014-11-04	97.18	2.82	0.00	0.00	0.00	0.00
2014-10-28	97.18	2.82	0.00	0.00	0.00	0.00
2014-10-21	97.18	2.82	0.00	0.00	0.00	0.00
2014-10-14	97.18	2.82	0.00	0.00	0.00	0.00
2014-10-07	97.18	2.82	0.00	0.00	0.00	0.00

October 7th Drought Summary



October 14th Drought Summary



October 21st Drought Summary



October 28th Drought Summary



