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Indiana State Climate Office

Monthly Weather Report

May 9, 2011



<http://www.iclimat.org>

April 2011 Climate Summary

Summary

After somewhat of a respite in March Indiana weather ramped up with a vengeance in April. Extreme weather and its impact on Hoosier daily life was everywhere as evidenced by the hundreds of storm damage reports collected during this very active weather month. Among the highlights are 29 confirmed tornadoes on 3 days this month with more tornadoes unconfirmed. Compare this to the long term average of 22 tornadoes per year in Indiana.

April had its warm and cold spells but overall was much warmer than normal. The state average temperature of 53.3° was 1.9° above the 30-year normal. This places the month as the 30th warmest April on record in Indiana since 1895. Recall the unusually warm April last year with its 2nd place ranking at 57.3°! The day split in April 2011 was 16 days of above normal temperature, 12 days of below, and 2 days at normal temperature. The daily state mean temperature was more than 10° below normal on just one day. On 3 days state mean temperatures were more than 10° above normal, with one of those days more than 20° above normal. The highest recorded temperature of the month was 88° on April 11th at Lexington. The coldest observed temperature was 19° at Angola and Knox on April 1st, and again at Angola the next day.

The state average precipitation total of 9.69 inches ranks April 2011 as the wettest April on record in Indiana. This total easily surpasses the 7.01 inches in 1947, the second wettest April on record. The CoCoRaHS observer in Straughn in east central Indiana measured 4.68 inches of rain on April 20th, the highest single day precipitation for the month. A few days later on April 24th the Holland observer in Dubois county recorded 4.03 inches, the second largest daily amount. Regionally April precipitation averaged about 7.0 inches in northern Indiana, 9.1 inches in central, and near 13.0 inches in the south. These huge totals are about double the normal amount in northern Indiana, nearly two and a half times normal in central, and triple the normal amount in southern Indiana!

Snow made a final appearance for spring 2011 in Indiana on April 19th just ahead of the tornado outbreak. Two tenths of an inch of snow was measured at Middlebury and a tenth inch in Hudson and Mishawaka that morning.

Hazardous weather was noted on 12 days this month, nearly half its 30 days. A nearly stationary front in the vicinity of Indiana persisted several days this month, and in conjunction with a fast jet stream overhead brewed many stormy days. On April 19th a near record 26 confirmed tornadoes occurred in one evening, not far behind the 37 tornadoes recorded on a single day on 2 June 1990. High winds toppled hundreds of trees across Indiana this month, many taking down power lines on the way. Trees also fell on vehicles and highways, while wind gusts damaged homes, garages,

sheds, grain bins, and many other structures across the state. The repetition of heavy rainfalls, especially in southern Indiana, led to flooded rivers and streams forcing evacuation of homes and buildings. Yet fortunately as of the end of the month no deaths had been recorded. Week by week descriptions and details of these many severe events and their impacts are found in the paragraphs which follow below.

The spring planting season never really got started this month. The Indiana Agricultural Statistics Service reports that only 2% of corn had been planted in Indiana by the end of April, 17 days behind normal progress. There was perhaps one positive outcome of the heavy rainfall this month. The drought which had continued in Indiana since last summer was finally eliminated. As of April 20th the National Drought Monitor has determined that the Indiana drought of 2010-2011 has now ended.

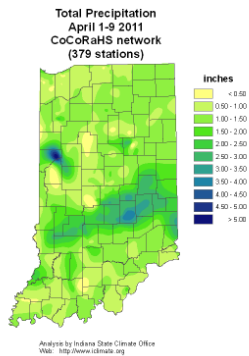
April 1st – 9th

A cool spell at the end of March carried over briefly into April. The new month opened at 9° below normal but warming was soon underway. State average temperatures by April 3rd and 4th were about 6° above normal. A quick shot of cool air the next day lowered temperatures to 2° below normal. Warmer weather returned for the remainder of the 9 days, initially holding steady at about 6° above normal for three days then rising nicely to 15° above normal on the final day. Overall for the interval state average temperatures came in at 4° above normal. Typically at the start of April Indiana daily maximum temperatures should range between 56° at the northern border to 65° in the far southwest. Daily minimum temperatures should vary between 36° and 42° north to south across the state.

The passage of two cold fronts the first half of the week preceded a stationary front which dominated Indiana weather the final three days. The cold fronts at the surface were a reflection of two upper atmospheric troughs over the state on April 2nd and 4th. The now frequent zonal flow pattern returned on April 6th and continued the next 4 days, supporting the stationary front at the surface. Rain fell nearly every one of these 9 days with the more significant totals measured on April 5th and 8th and little to no rain recorded on April 3rd and April 6th. Over the 9 day interval regional totals reached about 1.1 inch across northern Indiana, 1.7 inch in central areas, and 1.4 inch in the south. These totals are near normal in northern Indiana, 50% above normal in central sections, and 10% above normal across the south. The heaviest single day rainfall was 3.32 inches on April 5th at Shelbyville. Some other heavier amounts that day included 3.30 inches in Waldren, 3.26 inches from another observer in Shelbyville, and 2.87 and 2.85 inches at two points in Greenfield. The greatest totals over the full 9 day interval include 5.35 inches at Attica, and 3.80 inches and 3.51 inches at the two Shelbyville locations.

Storms in advance of the second cold front carried wind gusts exceeding 60 mph. On April 3rd a Williamsport home was damaged. In northeast Indiana trees fell in Leesburg and Winona Lake, damaging homes there. Other impacted communities included North Webster, Marion, and Churubusco where a broken tree brought down power lines across a street. As the cold front roared through Indiana the next day high winds and heavy rain pounded Shelbyville. Hail was reported nearby in and around Indianapolis. Power was out to about 600 homes in Tippecanoe county early in the day.

Another round of damaging storms arrived on April 9th, this time in southern Indiana. Microbursts with winds estimated near 100 mph destroyed barns in Bacon and Fredericksburg. There were numerous reports of downed trees and power lines in the vicinities of Monroe City, Marengo, New Pekin, and New Albany. Hail was noted in Oaktown, Farmersburg, Ireland, and Mitchell.



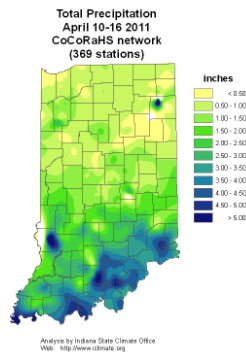
April 10th – 16th

Temperatures surged to 21° above normal at the start of the week behind the passage of a warm front through Indiana. The unseasonable warmth was brief as a strong cold front quickly followed the next day. By April 12th state average temperatures had returned to normal. A weak cold front pushed through Indiana on April 14th but temperatures held near normal. An occluded front marched through the state on the final day of the week and tapped into colder air. State average temperatures fell to 5° below normal to close out the week. Overall for the week temperatures averaged 4° above normal. Usually daily maximum temperatures the second week of April are expected to range from 60° in far northern counties to 69° in southwest Indiana. Daily minimums typically vary between 39° and 45° north to south across the state.

The passage of four fronts brought frequent rainfall to Indiana this week with heavier amounts trending southward. Regionally about 0.9 inch fell in northern Indiana, 1.2 inch in central, and a whopping 3.0 inches across southern Indiana. These totals are near normal in the north, about 30% above normal in central sections, and nearly 3 times the normal amount in southern Indiana. The highest single day amount was 3.52 inches found in the Charlestown rain gauge on April 12th. That same day the CoCoRaHS observer in Elizabeth noted 3.25 inches. The next day 3.18 inches was recorded in Paoli, 3.16 inches at Palmyra, and 3.06 inches in New Albany. Overall for the week the highest reliable totals included 4.86 inches in Paoli, 4.34 inches at Galena, 4.17 inches in Milltown, and 4.11 inches at Elizabeth.

Windy conditions behind the warm front on April 10 caused damage in northwest Indiana. The 60 mph winds in Remington caused large trees to fall across roads, power lines and cars, knocking out electrical power to the entire town. Power poles and lines also came down in Wheatfield. Trees were also reported down in Demotte, Plymouth, Ober, and Portage.

Houses were damaged in Danville the evening of April 15th ahead of the strong occluded front. One home had major roof damage. Strong winds removed vinyl siding and damaged garage doors of other houses nearby. Wind data indicated the strongest winds that night occurred in Owen county.



April 17th – 23rd

There comes rarely in Indiana an epic week of historical weather events, long remembered and compared to for years to come. This was one of those weeks. Two rounds of severe weather and heavy rainfall yielded 27 confirmed tornadoes in Indiana, extensive and widespread structural damage due to hail and winds, but amazingly no deaths. Consider that on the average only 22 tornadoes occur in Indiana over an entire year.

A nearly stationary front reaching from Texas to Maryland has become a fixture on the national weather map this week. This front does waver north and south with each low pressure system rippling eastward along its boundary. Each transition from warm to cool and back to warmer air with each frontal movement has triggered heavy rainfall across Indiana this week along with outbreaks of severe weather. A fast jet stream in the upper atmosphere above Indiana in tandem with these surface weather conditions favored the development of the extreme storms.

Temperatures to start the week were slightly cool at 2° below normal. A cold front ahead of a brief but violent push of cold Canadian air on April 19th and 20th saw state average temperatures plunge to 11° below normal. The cool ridge passed to the east of Indiana and the next warm up began. Temperatures rebounded to end the week at 4° above normal as the warm front slowed and pulled up stationary again over our state. For the week overall state temperatures averaged 3° below normal. Normal daily maximum temperatures this third week of April range from 64° in far northern Indiana to 72° in the far southwest. Daily minimums should typically vary from 43° to 49° north to south across Indiana.

In this active weather pattern rainfall was measured every day this week across the state. Totals for the week were about 2.6 inches in northern Indiana, 3.4 inches in central, and 3.8 inches in southern Indiana. These totals are 320% of normal in northern Indiana and about 370% of normal in central and southern sections. Heavy thunderstorms in midweek deluged some communities in central and

southern Indiana. On the morning of April 20th the CoCoRaHS observer in Straughn measured 4.68 inches, the single highest one day total in the state. Other extreme amounts noted that day included 4.00 inches in North Vernon, 3.98 inches and 3.87 inches at two locations in Greenfield, and 3.69 inches in Greencastle. Just the day before some far northern Indiana towns had measured light snowfall, such as Mulberry with 0.2 inch and 0.1 inch in Hudson, Mishiwaka, and Granger.

Late in the evening of April 19th and early morning of April 20th a line of severe weather marched quickly west to east across Indiana, spawning 26 tornadoes in the central and southern areas of the state. This is the 3th largest outbreak of tornadoes in a single storm noted in Indiana. The most ever recorded was 37 tornadoes on 2 June 1990.

Tornado reports of April 19-20 2011 in Indiana

Northern county	Tornado statistics	Southern county	Tornado statistics
Cass	EF0	Dubois	EF0 - path 0.3 miles
Cass	EF0	Dubois	EF0 - path 2.0 miles
Grant	EF1	Dubois	EF1 - path 3.1 miles
Grant	EF1	Dubois	EF1 - path 0.4 miles
Jay	EF1 - path 7.0 miles	Dubois	EF2 - path 3.3 miles
Tippecanoe	EF2	Orange	EF0 - path 0.5 mile
Vermillion +	EF2	Orange	EF1 - path 1.5 mile
Boone	EF1`	Orange	EF1 - path 0.7 mile
		Orange	EF2 - path 1.0 mile
		Harrison	EF0 - path 0.3 mile
		Washington	EF1 - path 1.4 mile
		Washington	EF0 - path 0.7 mile
		Washington	EF0 - path 0.6 mile
+ tornado crossed		Floyd	EF0 - path 5.2 miles
into Parke and		Scott	EF0 - path 12.3 miles
Fountain counties		Clark	EF0 - path 0.1 mile
		Clark	EF1 - path 1.2 mile
		Switzerland	EF1 - path 2.0 miles

On April 23rd another round of severe weather erupted but this time produced only a single tornado, a 4 mile long EF0 tornado in Jackson county. No deaths or injuries occurred in this event.

Damages associated with the severe weather outbreaks this week were extensive and are not fully itemized here. More than 180 Indiana incidents of severe weather damage were reported to the National Weather Service and certainly there could be more. Reports of fallen trees, broken limbs, and power lines down were by far the most common damage. Some of the more significant damage categories are reviewed here.

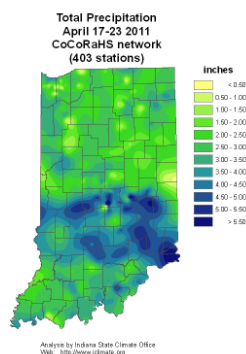
Lightning strikes started several fires around the state. The city of Indianapolis responded to 64 fire runs on April 19th, several suspected to be due to lightning strikes. An Indianapolis gas station was struck by lightning and caused \$50,000 in damages. In nearby Hamilton county lightning started a small fire in the roof of its library. A West Lafayette home in Tippecanoe county was started on fire by lightning.

The most destructive and extensive storm damage around the state was the result of strong winds. In Boone county a few cars and 4 semi-trucks were blown off of I-65 near Thorntown while a truck ended up in the ditch when blown off I-74 in Montgomery county. High winds knocked out emergency communications in this county and in Clinton county.

Barns, grain bins and elevators, tool sheds, hog barns, and mobile home trailers were the most common casualties in the face of strong winds. Losses involving collapsed barns and buildings moved off their foundations, small buildings flipped or blown away, and roofs stripped away in the wind were the topic of many an Indiana storm report.

Besides tornadoes and wind, hail was another destructive force this week. On April 19th there were 13 reports of hail 1.00 inch to 1.75 inch in diameter which caused destruction in southwest and central Indiana. Three days later six reports of hail ranging up to 2.00 inches in diameter was received from the Bedford area. The next day Clark county noted 1.00 inch hail.

Not to be left out, flooding caused by drenching thunderstorms was another menace this week. Indiana rivers were at or near flood stage by the end of this week. Jackson county had measured over 5 inches of rainfall in recent days and flash flooding is being closely monitored. Some roads in southern Indiana near the Ohio River have closed due to high water. A kayaker in Putnam county is missing after he left on a solo trip down a flooded creek in that area. His dog returned home alone the next day.



April 24th – 30th

The destructive weather pattern of last week continued almost to the end of April. The nearly stationary front which has resided in the vicinity of Indiana for several days spawned still more severe weather this week, including tornadoes, hail, high winds, and heavy rainfall. A split jet stream in the upper atmosphere, its northern Canadian branch merging with its southern branch over Indiana, fueled the severe weather in our region.

Temperatures were on the mild side to start the week, averaging 4° above normal. Two days later after the front slid northward the statewide average temperature peaked at 7° above normal, the warmest day of the week. The front reversed direction on April 28th and re-crossed the state as a cold front. Temperatures fell sharply to 5° below normal. A high pressure ridge cleared Indiana skies the next day and allowed temperatures to rebound to 2° above normal to close the week and month. Overall for the week statewide temperatures averaged 2° above normal. Typically daily maximum temperatures the final week of April should range between 66° and 73° north to south across Indiana. Normal daily minimums should vary between 44° in far northern counties to 50° in the far southwest.

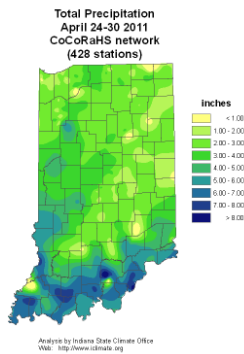
The very wet weather pattern of recent weeks continued nearly to the final April day. Rain was measured on 6 of the 7 days this week with far heavier amounts in southern Indiana than elsewhere in the state. Rain gauges were fullest on Easter morning in far southern Indiana. The heaviest single day totals that morning included 4.03 inches in Holland and 3.81 inches at Darmstadt. The CoCoRaHS observer in New Pekin recorded 3.67 inches while the Jeffersonville volunteer noted 3.34 inches on that April 24th Sunday. Total rainfall for the entire week was impressive. In Jeffersonville the weekly total was a whopping 8.08 inches with Darmstadt not far behind at 7.76 inches. Huntingburg noted 7.47 inches for the week, Holland 7.41 inches, and Charlestown 7.35 inches. Regionally on average about 2.5 inches fell this week in northern Indiana, 3.0 inches in central, and 4.7 inches across the south. These totals are about 350% of normal in northern and central sections and 470% of normal in southern Indiana.

All that heavy rainfall led to extensive flooding, particularly in southern Indiana. A flood warning was in effect in Clark, Floyd, Harrison, Crawford, and Jefferson counties until April 28th. Ten counties have declared states of flood emergency, which will enable claims toward state and federal aid: Dubois, Floyd, Jackson, Jefferson, Jennings, Martin, Perry, Pike, Posey, and Warrick. Posey county has recorded their highest Ohio River level since 1950. Residents are being evacuated there and farmers are moving their equipment to higher ground. In Rockport this is the highest river level there in 21 years. Rockport residents are leaving their homes and a children's hospital is being evacuated.

Some communities are sandbagging along rivers and adding water pumps. Seymour and Columbus residents resorted to sandbagging and building concrete walls to keep the water out. In Clarksville extra pumps were brought in to assist the pumping station there while the Clark county Red Cross has opened shelters for evacuees. Evacuations have been ordered and some roads have been closed. In Utica water is being pumped out of town into empty farm fields. The Indiana National Guard and prison inmates are sandbagging northeast Evansville and New Harmony State Park. Sandbagging was underway in New Harmony town to protect the water supply. Hospital patients are being moved in Evansville. Floodgates went up in Newburgh. The Red Cross opened shelters in Posey and Harrison counties. In southwest Indiana about 15 to 20 homes are threatened by flooding in Knox county. The city of Vincennes is installing flood gates to protect residential property there. Roads are closing in Gibson county.

Early on the morning of April 25th two confirmed tornadoes ripped through southwest Indiana. An EF2 tornado was confirmed in Warrick county and an EF1 tornado in Pike county. Three more tornadoes were reported in these and in Daviess counties but not confirmed. No deaths were recorded. The next day heavy thunderstorms generated 1 to 2 inch hail in Laporte, Warrick, Dubois, and Lawrence counties. In all 11 reports of hail were received that day around Indiana. As a cold front pushed across Indiana on April 28th wind damage was problematic in southeast Indiana. In Decatur county 24 homes lost their roofs and trees fell on cars. In Jackson county trees fell on top of cars and a semi-trailer traveling on I-65. Trees fell on homes in Jennings county.

A silver lining in the devastation is that the 2010-2011 Indiana drought is now officially over. The last area of northern Indiana that remained in the abnormally dry category (D0 class) of the National Drought Monitor for many weeks is finally gone. As of April 20th the entire state of Indiana is now classified as drought free. This is the first time since July 27, 2010, that no area in Indiana is classified within any of the D0 through D4 drought categories.



April 2011

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	49.6	49.5	0.1
North Central	49.2	48.9	0.3
Northeast	48.7	48.5	0.2
West Central	53.4	51.5	1.9
Central	53.1	50.9	2.3
East Central	52.2	49.9	2.3
Southwest	58.2	54.9	3.3
South Central	57.7	54.2	3.4
Southeast	56.4	53.1	3.3
State	53.3	51.4	1.9

Region	Precipitation	Precipitation		Percent of Normal
		Normal	Deviation	
Northwest	7.50	3.60	3.89	208
North Central	7.04	3.59	3.45	196
Northeast	6.39	3.47	2.91	184
West Central	9.22	3.88	5.34	238
Central	9.39	3.91	5.48	240
East Central	8.67	3.78	4.89	230
Southwest	12.36	4.45	7.91	278
South Central	13.14	4.42	8.72	297
Southeast	13.49	4.21	9.28	320
State	9.69	3.94	5.75	246

Spring 2011 to date (March - April)

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	43.9	43.9	0.0
North Central	43.3	43.3	0.0
Northeast	42.6	42.8	-0.2
West Central	47.4	46.0	1.5
Central	47.1	45.4	1.8
East Central	46.2	44.4	1.8
Southwest	51.9	49.7	2.1
South Central	51.5	49.1	2.3
Southeast	50.2	48.1	2.2
State	47.2	46.0	1.3

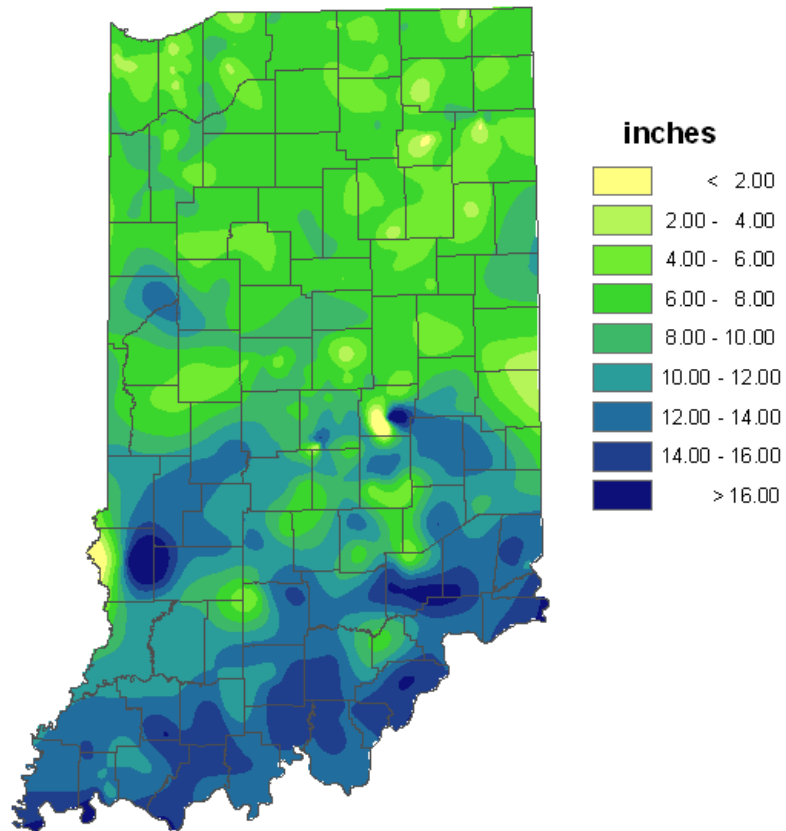
Region	Precipitation	Precipitation		Percent of Normal
		Normal	Deviation	
Northwest	9.92	6.52	3.40	152
North Central	9.63	6.37	3.26	151
Northeast	8.95	6.18	2.76	145
West Central	12.16	7.23	4.92	168
Central	13.28	7.19	6.08	185
East Central	12.85	6.85	5.99	187
Southwest	16.75	8.68	8.08	193
South Central	17.39	8.59	8.80	203
Southeast	17.97	8.16	9.81	220
State	13.21	7.34	5.87	180

2011 Annual so far

Region	Temperature	Temperature	
		Normal	Deviation
Northwest	33.8	34.7	-0.9
North Central	33.4	34.4	-1.0
Northeast	32.9	34.0	-1.1
West Central	36.8	36.9	0.0
Central	36.8	36.5	0.3
East Central	36.1	35.7	0.4
Southwest	41.8	41.1	0.6
South Central	41.5	40.7	0.7
Southeast	40.4	39.8	0.7
State	37.1	37.2	0.0

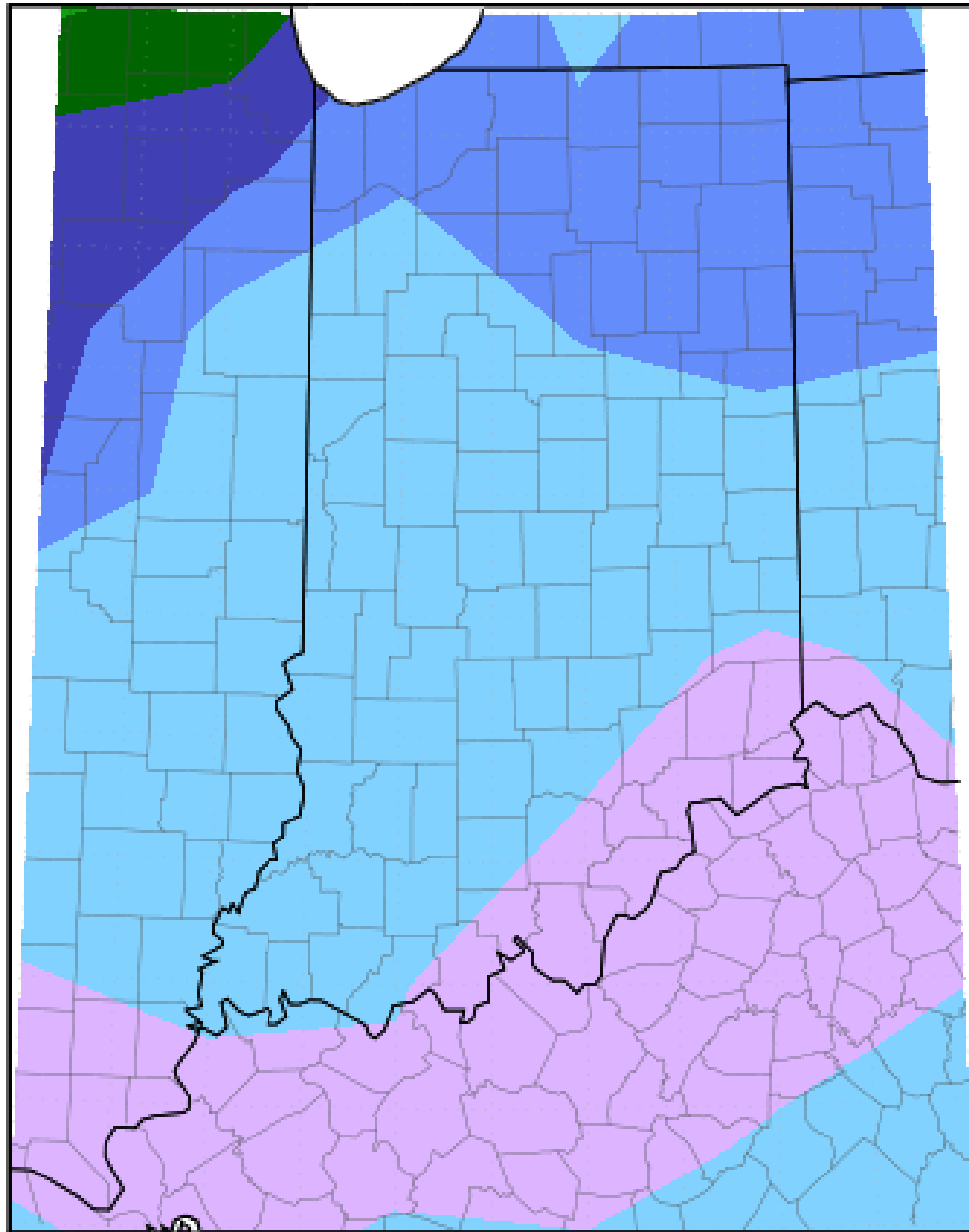
Region	Precipitation	Precipitation		
		Normal	Deviation	Percent of Normal
Northwest	14.13	10.08	4.05	140
North Central	14.21	10.21	4.00	139
Northeast	13.94	9.95	3.99	140
West Central	18.14	11.68	6.46	155
Central	20.26	11.80	8.46	172
East Central	19.98	11.29	8.68	177
Southwest	22.37	14.55	7.82	154
South Central	22.90	14.61	8.29	157
Southeast	24.27	13.96	10.31	174
State	18.91	12.05	6.85	157

**Total Precipitation
April 2011
CoCoRaHS network
(428 stations)**



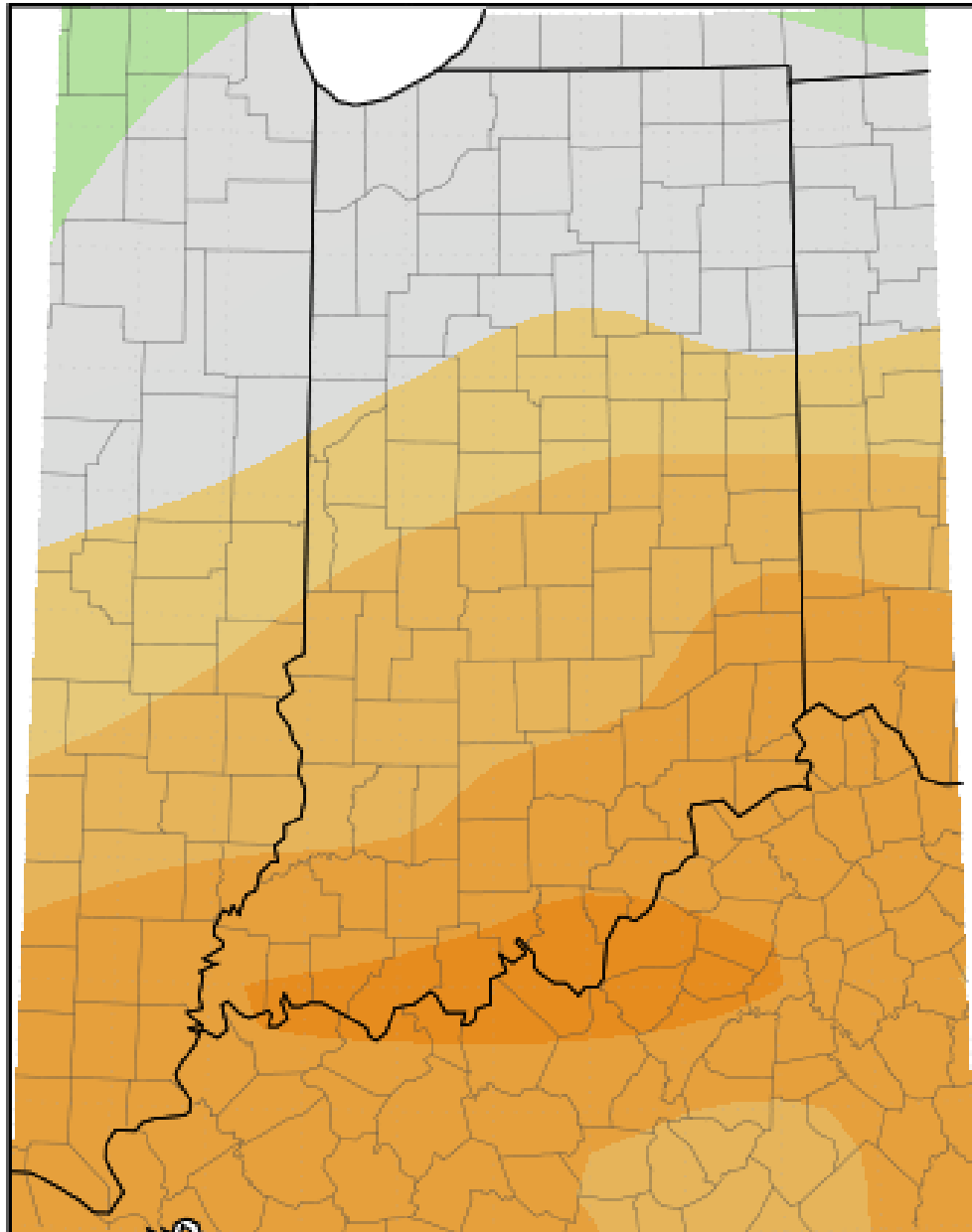
Analysis by Indiana State Climate Office
Web: <http://www.iclimat.org>

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



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

Average Temperature (°F): Departure from Mean
April 1, 2011 to April 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, April 5th has 66.7% of Indiana under no drought, and 33.3% 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.

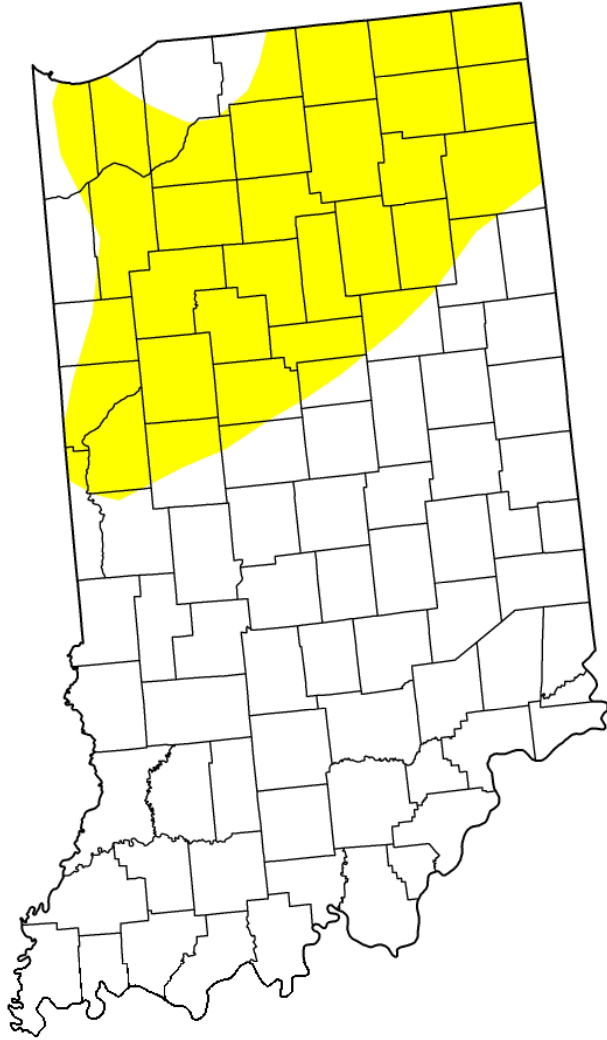
Intensity:



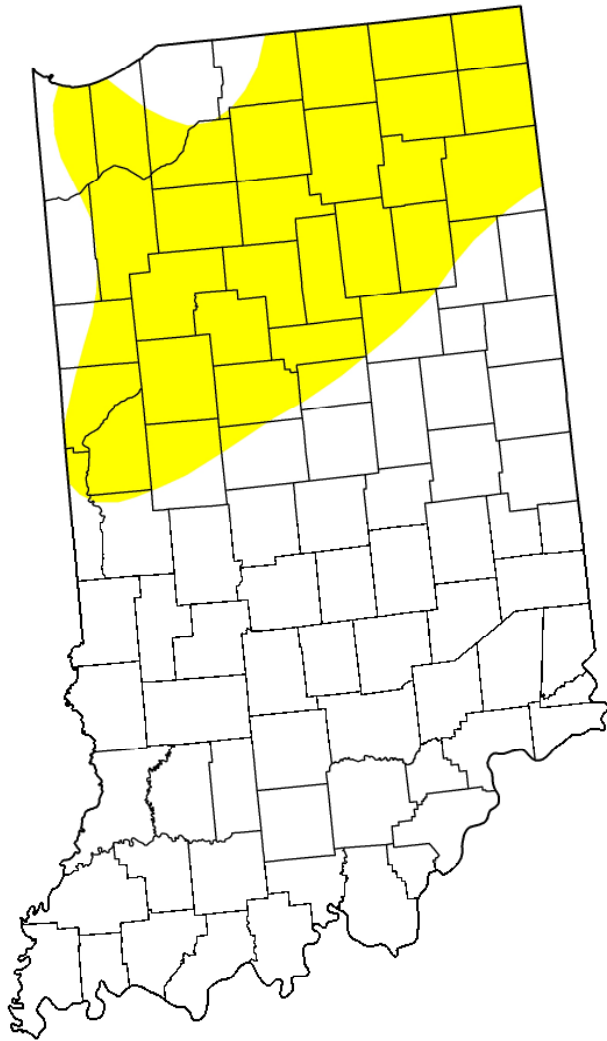
Drought Condition (Percent Area): Indiana

Date	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
04/26/11	100.00	0.00	0.00	0.00	0.00	0.00
04/19/11	66.48	33.52	0.00	0.00	0.00	0.00
04/12/11	66.48	33.52	0.00	0.00	0.00	0.00
04/05/11	66.72	33.28	0.00	0.00	0.00	0.00

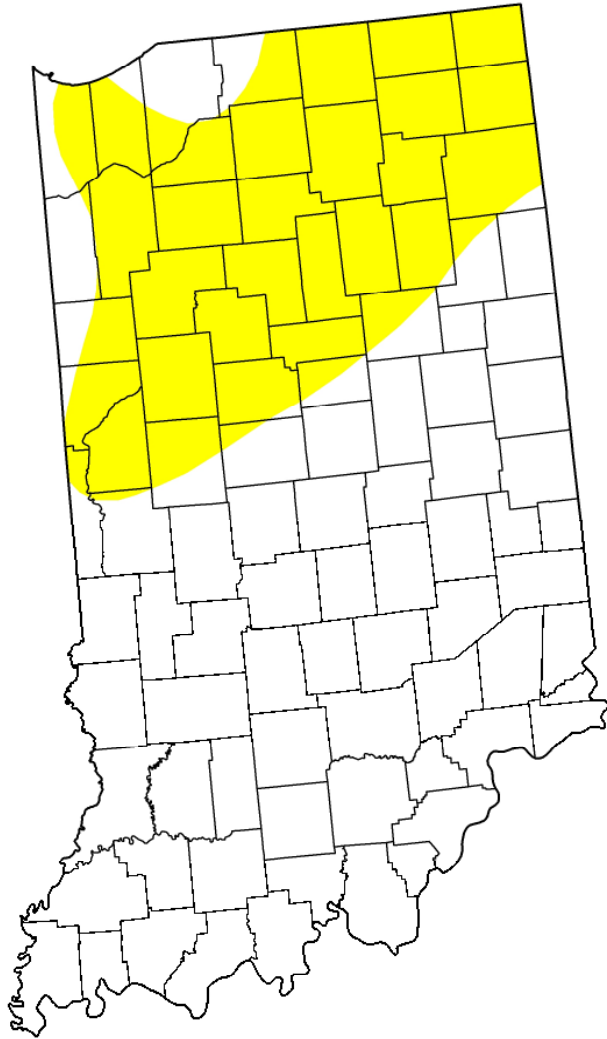
April 5th Drought Summary



April 12th Drought Summary



April 19th Drought Summary



April 26th Drought Summary

