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Indiana State Climate Office

Monthly Weather Report

Apr 1, 2009



<http://www.iclimat.org>

March 2009 Climate Summary

Summary

March is in the books and it continued the trend of extreme weather we have experienced during the first quarter of 2009. Major temperature swings were prevalent and widespread however the month's precipitation was not. There is a huge discrepancy in precipitation intensity from the north to the south. Weather patterns brought rain more often to the south however the states strongest storms were felt in the north.

A typical transition month where you experience everything nature has to offer, March had its ups and downs as expected. In less than a week temperatures climbed or fell more than 40F. There were multiple occurrences of prolonged warmth (5th through 10th, 15th through 18th) as well as periods abnormally cool (1st through 3rd, 11th through 13th). When all was said and done, however, the high highs outweighed the low lows. March 2009 ranks as the 22nd warmest March in the last 115 years. The statewide average temperature was 43.8F, 3.1F above normal.

While the month saw unseasonable warmth, the precipitation patterns were awkward. More storm systems passed over the Kentucky-Indiana border than over Lake Michigan. What are we left with? The north receiving almost twice as much precipitation than the south. Why? Intensity. The storms that passed over the northern counties packed quite a punch, especially during the 7th through 9th when some counties received over 2.5 inches of rain. Of course there's always the lake to blame as well. March 2009 is the 57th wettest March since 1895. It's also the 59th driest, meaning the month is rather typical and unspectacular. Of all 115 March's on record, 2009 was about normal. That is reflected in the statewide summary where Indiana received 97% of the normal precipitation of 3.40 inches.

March 1st – 10th

The end of February cold spell trickled into the first few days of March. The abnormally cold air kept high temperatures 14F or more below normal on the 1st, 2nd, and 3rd. The chill was the result of high pressure centered over Minnesota and then the Great Lakes, rushing cold Canadian air into the Mid-West. When the high pressure region moved to farther to the east, warm air began to fill in behind it leaving the next few days quite warm. Temperature transitioned on the 4th, with temperatures right around normal. Then on the 5th and 6th Indiana was passed over by a warm front associated with a synoptic system. The system raised high temperatures to more than 16F above normal on the 5th, 6th, and 7th. Highs in the low- to mid-60s were widespread. System evolution and breakdown brought about another warm front on the 8th, keeping temperatures

well above normal. Many counties across the state remained more than 18F above normal. As the cold front portion of the system passed on the 9th, temperatures dropped off a bit but remained above normal. Another synoptic system entered on the 10th. Once again a warm front passed raising temperatures to 70F for almost the entire state. The average high temperature for the first 10 days of March 2009 was about 55F, more than 6F above normal.

The cold snap had little moisture associated with it and almost the entire state remained precipitation free until the 7th. There was some light lake effect snow on the 2nd. Lake, Porter, La Porte, St. Joseph, Newton, and Jasper counties all received about 0.5 inches of snow from the lake moisture. Precipitation-free days lasted until the afternoon of the 7th, when a cold front passed. Northern and central counties experienced some rain, with accumulations of 0.3 inches. The moisture pushed further south on the 8th and rain became heavier and more widespread. The heaviest storms raged across northern Indiana where daily precipitation totals reached more than 1.5 inches. Short-lived but severe storms passed multiple times in central and southern counties, which contained strong streamline winds and spawned multiple tornadoes. Two-day rainfall totals for the 7th and 8th were 2.52 inches in South Bend, 2.17 inches in Goshen, 2.21 inches in Benton Harbor, and 2.65 inches in North Webster. If the same system had passed when temperatures were cooler, the 2+ inches of rain may have been 20 inches of snow. The heavy rain passed through the north overnight, resulting in almost another inch of rain through the early morning hours on the 9th in Lagrange, Steuben, Noble, and De Kalb counties. Another 0.25 inches fell across much of Indiana early on the 9th before a slight reprieve. The dry conditions during the late morning, afternoon, and evening ended late that night as another system passed through the state. Heavy rain once again fell in northern Indiana, dropping another inch near the lake. A vast majority of the state saw limited precipitation, with totals of less than 0.2 inches. The consecutive systems dropped an abnormal amount of rain in a small timeframe, resulting in flooding problems. During the first 10 days of March, more than 3.5 inches of precipitation fell around the lake and more than 1.5 inches was received in the rest of the northern and central Indiana counties. The south wasn't completely spared but did receive a small amount compared with northern counties.

The successive systems that crossed the state on the 7th and then on the 10th packed quite a punch. After no weather-related events for most of the first week, the next four days were filled with impacts associated with heavy rain and strong winds. During the late afternoon and early evening on March 8th, tornadoes were reported in or near Milan, Odon, Fayetteville, Oaktown, and Columbia City. In Milan, at least one roof was ripped off a house and there was extensive damage done to power lines along the tornado's path. In Odon, a family was lucky to survive after their mobile home was severely damaged by the tornado. A local church also suffered minor damage. At least three families ended up in the hospital after a tornado destroyed their homes in Fayetteville. One of the houses was wrecked when a school bus was picked up and tossed into it by the strong winds. In addition to the three destroyed houses, at least 19 more were damaged. Debris from the Fayetteville tornado was found in Columbus, two counties and more than 45 miles away. The Columbia City tornado touched down in a mobile home park, destroying three homes and damaging at least 20 others. The National Weather Service determined the tornado reached the intensity of an EF1, with winds up to 105 mph. It lasted for over 1.5 miles and was approximately 100 yards wide. Thankfully there were no deaths or serious injuries. Even if a tornado didn't touch down, strong winds were a problem. Streamline

winds were responsible for destroying silos and tearing the roof off a barn in Freelandville. The same thing happened in Flora, where a church roof was removed by strong winds. In addition to the tornadoes and streamline winds, heavy rain produced flash flooding which trapped people attempting to drive through high water in Nappanee. State police were able to rescue the trapped individuals. Minor flooding closed some roads across northern Indiana on the evening of March 8th, including streets in South Bend, Elkhart, and Anderson. Heavy rain on the 7th and 8th combined with the additional rain on the 9th and 10th to create some severe flooding possibilities along the Wabash and Tippecanoe rivers. In White County, Diamond Point and Bluewater developments, along with the Lake Arthur Mobile Home Park, were evacuated because of the threat for major flooding. Residents of more than 55 homes were being put in a shelter at the First Christian Church in Remington. In Fort Wayne, citizens were out in full force to help local officials create sandbag and clay walls plus install pumps on the evening of March 10th to prevent flooding in neighborhoods near the river.

March 11th – 17th

When the second of successive cold fronts finally passed late on the 10th, the state was dropped into conditions it hadn't known for more than a week: cold. Temperatures shifted more than 30F about the normal between the 10th and 11th. Highs reached the upper 60s on the 10th but were now in the low 30s. Even cooler air rushed in behind the system after it vacated the Mid-West, dropping temperatures further. Highs struggled to breach 30F on the 12th. As the cool air mass progressed to the northeast temperatures warmed and things were finally normal by the 14th. Until, of course, we began to experience the other end of the spectrum. The jet stream pattern allowed warm Gulf air to infiltrate much of the central U.S., raising temperatures about 6-8F per day. Highs on the 15th were in the low 50's for most of the state. By the 17th they approached and even pushed past 70F, more than 20F warmer than normal. Fort Wayne tied the daily high temperature record of 71F for March 17th, also recorded on that day in 2003. The average statewide temperature for March 11th through 17th for Indiana is approximately 50F, about 2F above normal.

Rain, and lots of it, fell for three consecutive days, from March 9th through 11th for most of central and northern Indiana. The heaviest fell on the evening of the 9th and through the 10th but residual moisture remained through the 11th. Counties across Indiana recorded another 0.3 inches of rain on the 11th. However the northeast was drenched. Lagrange, Steuben, Noble, De Kalb, Whitley, and Allen counties all received more than 1.5 inches of rain, and some cities in central and southern De Kalb reported close to 2 inches for the 11th. The rain ceased on the 12th, but with a drop in temperature combined with moisture from the lake some northwestern counties received a dusting of snow. Some light snow even fell in extreme southern parts of counties bordering Kentucky on the 13th. A system passing to the south of Indiana skimmed a few counties dropping a light dusting of snow. As temperatures warmed on the 14th and 15th, the system skimming to the south brought rain to the counties bordering Kentucky. No precipitation was reported on the 16th and 17th, which were two fabulous days if you like warm and sunny weather. It was a quite pleasant day weather-wise for St. Patrick's Day 2009. The statewide precipitation total was, on average, about 0.8 inches. However, north central and northern counties received more than 1.5 inches this week with even higher local totals.

The massive amount of rain received in some counties – such as Carroll, White, Jasper, and Tippecanoe – from the 9th through the 11th caused flooding. The Tippecanoe and Wabash rivers rose to dangerous levels and did not peak in some areas until the 14th or 15th. About 200 homes near the Oakdale Dam were affected by flooding, though many of the homes had already been evacuated. Flow through dams along the river rose to levels rivaling those in February 2008, though not nearly as high as in January 2008. The Lake Arther Mobile Home Park in Jasper County was also evacuated due to the rising water. St. Joseph, Fulton, Plymouth, Elkhart, Whitley, and Pulaski counties issued some evacuations, too. Not only were homes endangered but roads were a problem as well. High water sat across many roads in the affected counties for a day or two. No major accidents were reported but traffic was worse than usual across northern counties due to road closures and reduced lanes. Some affected cities, such as Fort Wayne, brought in additional pumps from out of state to pump sewers and roads. In Porter County, yet another region hit with flooding, a delivery woman tried to forge a flooded street and needed to be rescued by boat on a county road affected by flooding of the Kankakee River.

March 18th – 24th

The abnormally warm weather that began on the 15th continued through the 18th. Highs across Indiana remained in the mid to upper 60's, more than 15F above normal. Conditions reverted back to what is expected this time of year on the 19th as the trailing cold front of a synoptic system in Canada crossed the Mid-West. This normal pattern lasted a mere two days thanks to the passing of an area of high pressure which thrust warm gulf air back into the region. Temperatures again jumped into the lower 60's on the 22nd and 23rd and continued to rise on the 24th as a new system approached. The average temperature for the 18th through 24th of March 2009 was approximately 61F, slightly more than 9F above normal.

Moisture entered central and southern counties in conjunction with the cold front late on the 18th. Most of the rain fell during the morning and early afternoon on the 19th. The heaviest rains were concentrated in the south central region consisting of Lawrence, Jackson, Washington, and Orange counties. Their rainfall totals reach slightly more than 0.5 inches. This storm system was quite uneventful and rather weak. Save for a few passing clouds, the state received endless sunshine from the 20th through much of the day on the 23rd. Conditions became quite windy during the day on the 24th thanks to an approaching synoptic system. Clouds increased and some light rain fell across western and southern counties that night. Once again the system lacked punch and weak rains produced under 0.2 inches of rain for the day. This week was mostly dry, with the northwest seeing little, if any, precipitation. The largest storm totals were received below Indianapolis, in the south central region. Still, weekly precipitation totals there were less than 0.6 inches. This drier period will make up for the wet period that occurred earlier this month.

This seven day period in mid-March was quiet and safe, at least in Indiana. There were no major weather-related events or impacts of note between the 18th and 24th.

March 25th – 31st

Temperatures began to fall on the 25th thanks to the approach and passing of a cold front throughout the day. Highs fell from the upper 60s on the 24th to the upper 50s on the 25th, still more than 5F above normal. A second cold front passed on the 27th reducing highs to the low 50s, right at the normal. They'd hover in this vicinity on the 28th before rapidly falling off on the 29th as cold arctic air rushed in behind the system. High temperatures fell into the mid 30s. A warm front passed on the 30th allowing highs to climb back to normal to end the third month of the year. The average daily high temperature for the final week of March was 55F, about 2F above normal.

Precipitation the entered the state late on the 24th strengthened during the morning and early afternoon of the 25th. The state was drenched with many counties reporting close to 0.5 inches of rain. The system moved slowly and dropped more rain sporadically on the southeastern counties on the 26th and 27th. The tail end of the second cold front contributed to the prolonged moist period and dumped more rain across Indiana on the 28th. The storms that passed were short lived and daily rain totals barely breached 0.1 inches. As cold air filled in behind the front northwestern counties were treated with some snow and sleet on the morning and afternoon on the 29th. Counties around the lake received over an inch; elsewhere the snow melted once it hit the ground. The southern region received some more intermittent rain resulting in another 0.5 inch in some cities. The moisture lingered into the early morning hours on the 30th. A final system passed through western Indiana late on the 31st, producing light showers and thunderstorms along the Illinois border. Most areas in the state received over 1.1 inches of precipitation over the final seven days of March. Southwestern counties Posey and Vanderburgh received the most, topping 2 inches.

Though it was an active week for the weather, impacts were kept to a minimum. The combination of snow, sleet, and rain on the evening of the 28th through the afternoon on the 29th created slick roadways and more flooding concerns in northwest Indiana, around Lake Michigan. No significant accidents or injuries were reported however.

March Summary

Temperature

Region	Temperature	Normal	Deviation
Northwest	41.1	38.6	2.5
North Central	40.8	37.9	2.9
Northeast	40.1	37.3	2.8
West Central	44.2	40.6	3.6
Central	43.9	40.1	3.8
East Central	42.9	39.1	3.8
Southwest	47.8	44.8	3.0
South Central	46.5	44.2	2.3
Southeast	45.8	43.1	2.7
State	43.8	40.7	3.1

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	5.00	2.92	2.08	171
North Central	5.38	2.78	2.60	193
Northeast	5.50	2.71	2.79	203
West Central	2.48	3.36	-0.88	74
Central	2.25	3.28	-1.03	69
East Central	1.81	3.08	-1.27	59
Southwest	2.59	4.23	-1.64	61
South Central	2.61	4.17	-1.56	63
Southeast	2.11	3.95	-1.84	53
State	3.29	3.40	-0.11	97

Spring-to-Date

(same as March)

Temperature

Region	Temperature	Normal	Deviation
Northwest	41.1	38.6	2.5
North Central	40.8	37.9	2.9
Northeast	40.1	37.3	2.8
West Central	44.2	40.6	3.6
Central	43.9	40.1	3.8
East Central	42.9	39.1	3.8
Southwest	47.8	44.8	3.0
South Central	46.5	44.2	2.3
Southeast	45.8	43.1	2.7
State	43.8	40.7	3.1

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	5.00	2.92	2.08	171
North Central	5.38	2.78	2.60	193
Northeast	5.50	2.71	2.79	203
West Central	2.48	3.36	-0.88	74
Central	2.25	3.28	-1.03	69
East Central	1.81	3.08	-1.27	59
Southwest	2.59	4.23	-1.64	61
South Central	2.61	4.17	-1.56	63
Southeast	2.11	3.95	-1.84	53
State	3.29	3.40	-0.11	97

Annual-to-Date

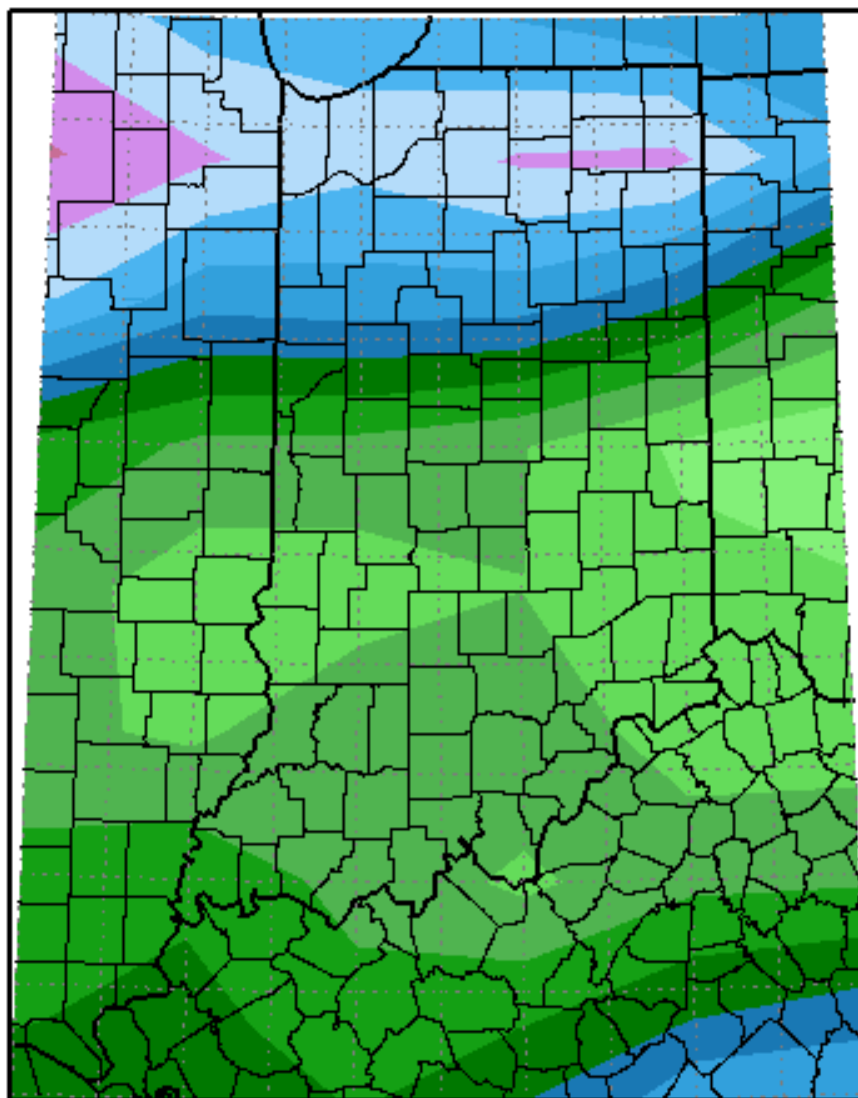
Temperature

Region	Temperature	Normal	Deviation
Northwest	29.0	29.8	-0.8
North Central	28.8	29.5	-0.7
Northeast	28.6	29.2	-0.6
West Central	32.0	32.0	0.0
Central	31.9	31.8	0.1
East Central	31.1	30.9	0.2
Southwest	36.7	36.5	0.2
South Central	35.4	36.3	-0.9
Southeast	34.8	35.3	-0.5
State	32.1	32.4	-0.3

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	9.12	6.47	2.65	141
North Central	9.72	6.63	3.09	147
Northeast	9.75	6.47	3.28	151
West Central	6.85	7.80	-0.95	88
Central	6.36	7.89	-1.53	81
East Central	5.25	7.52	-2.27	70
Southwest	7.90	10.10	-2.20	78
South Central	7.72	10.19	-2.47	76
Southeast	7.06	9.75	-2.69	72
State	7.76	8.12	-0.36	96

Total Precipitation in Inches
March 1, 2009 to March 31, 2009

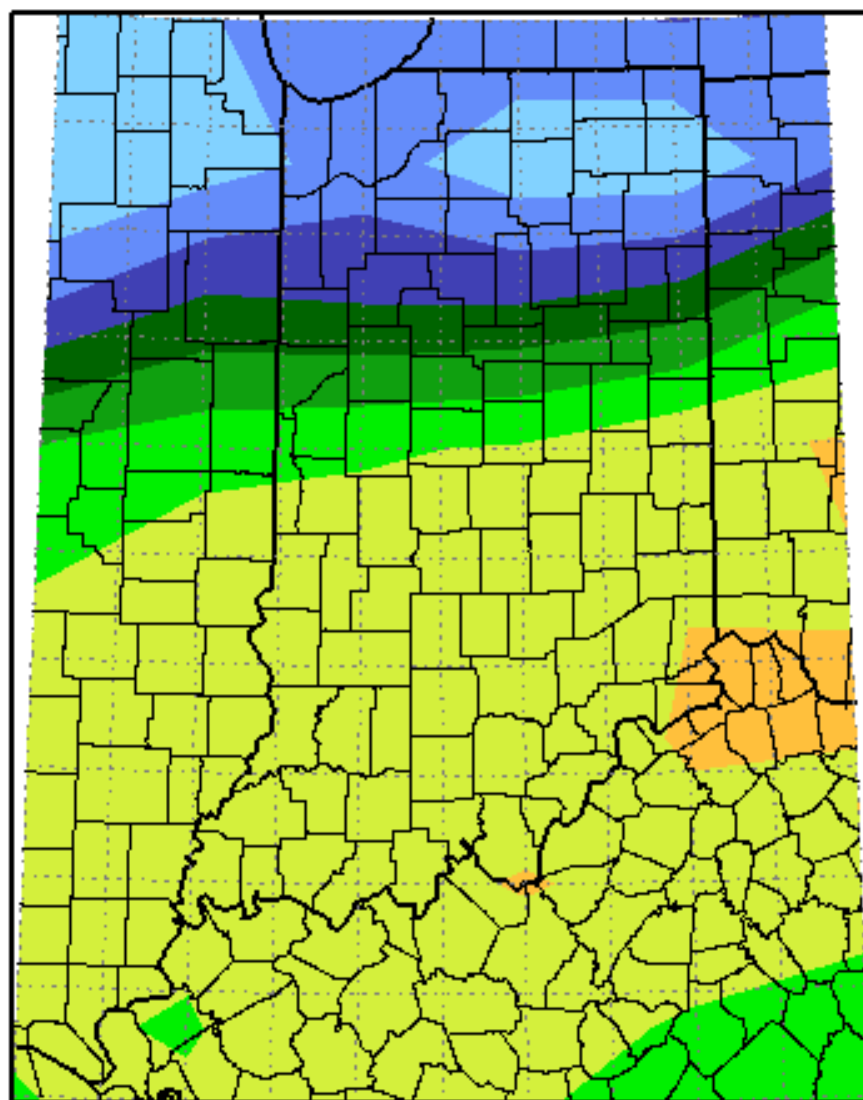


NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

Total Precipitation Percent of Mean
March 1, 2009 to March 31, 2009

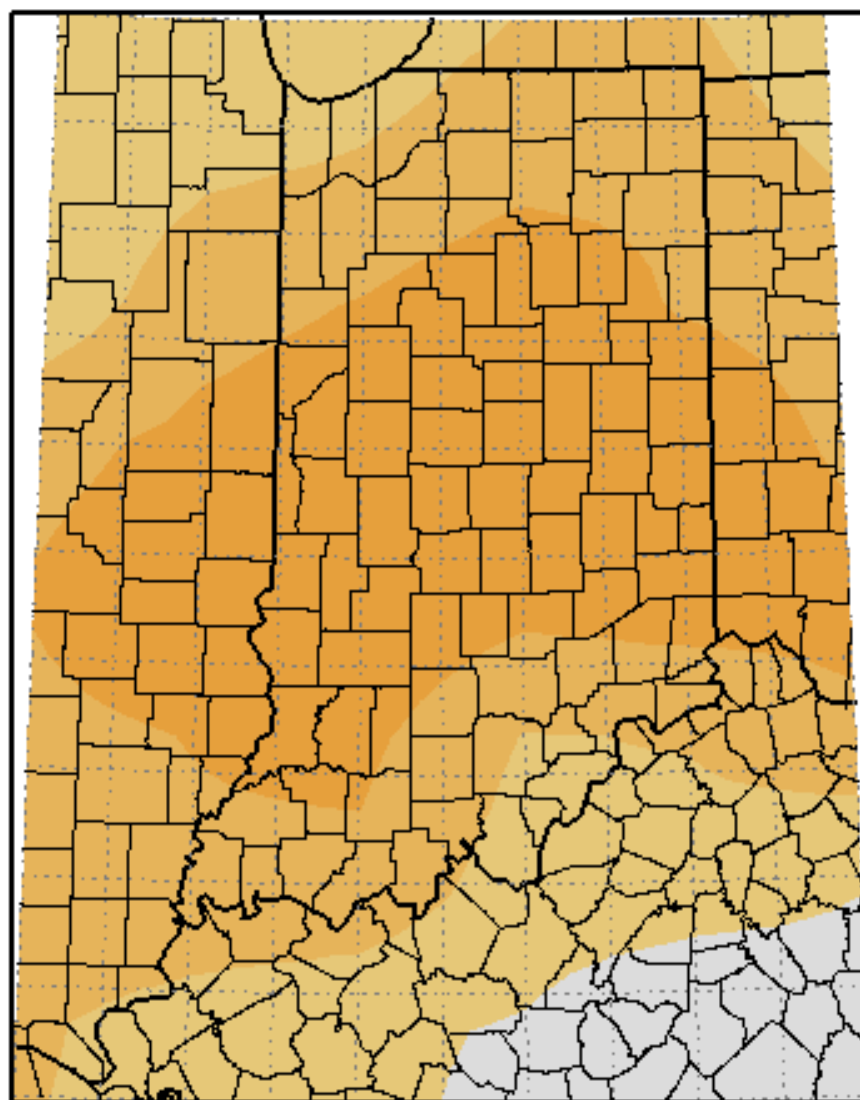


NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

Average Temperature Departure from Mean in Degrees F
March 1, 2009 to March 31, 2009

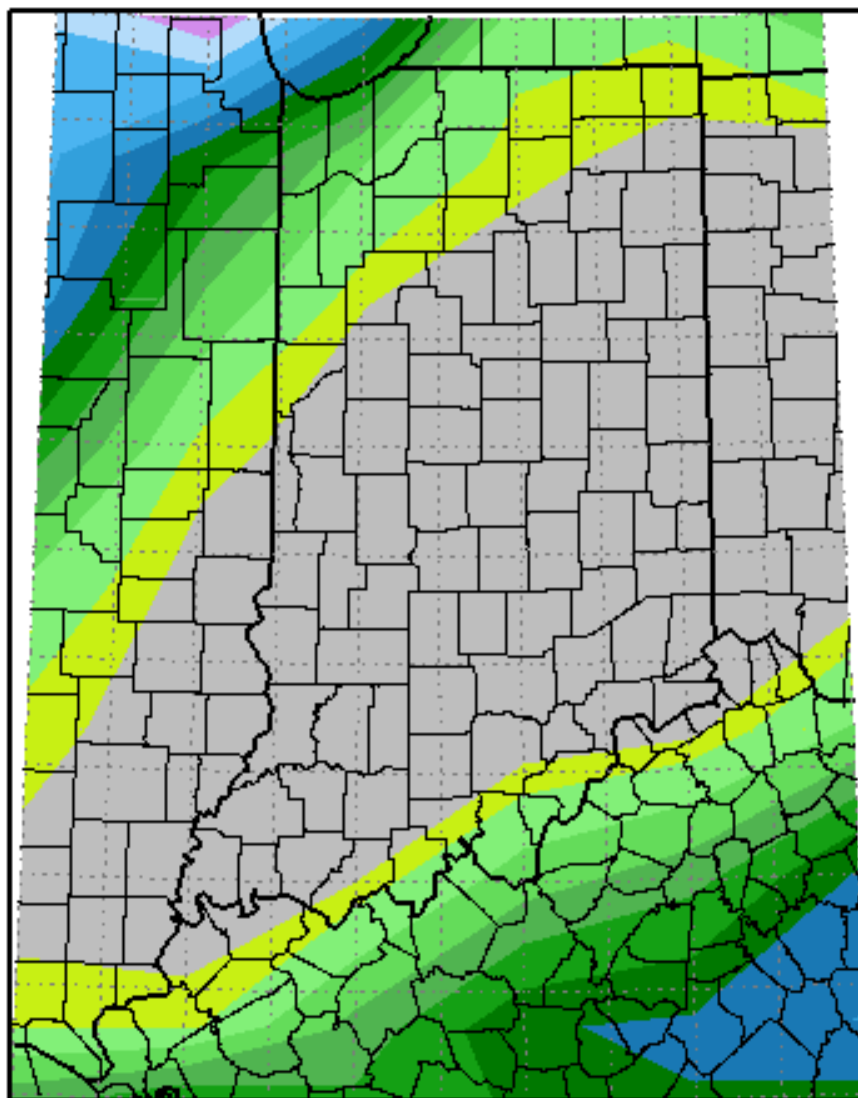


NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

Total Snowfall in Inches
March 1, 2009 to March 31, 2009



NOAA Midwest Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

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, March 3rd has 100% of Indiana under no drought, and 0.00% of Indiana under at *least* D0 through D4 drought status. This is followed by 0.00% as D1 through D4 status. To obtain the amount that is D0 status, simply subtract the D1-D4 column from the D0-D4 column, thus giving you the percentage of area with abnormally dry conditions. 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.

D0 Abnormally Dry
 D1 Drought - Moderate
 D2 Drought - Severe
 D3 Drought - Extreme
 D4 Drought - Exceptional

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
03/03/09	100.00	0.00	0.00	0.00	0.00	0.00
03/10/09	100.00	0.00	0.00	0.00	0.00	0.00
03/17/09	100.00	0.00	0.00	0.00	0.00	0.00
03/24/09	100.00	0.00	0.00	0.00	0.00	0.00

March 3rd Drought Summary



March 10th Drought Summary



March 17th Drought Summary



March 24th Drought Summary

