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Indiana State Climate Office

Monthly Weather Report

http://www.iclimate.org

Oct 5, 2009

September 2009 Climate Summary

Summary

At first glance statewide climate statistics would suggest that September 2009 weather was rather typical for Indiana. Both temperature and precipitation averaged very close to the historical 30-year (1971-2000) normals. However averages can mask extremes and such was the case in September.

The first half of the month was generally quiet with a gradual warming trend from below normal to near normal temperatures with mostly dry conditions. A surge of warm moist air from the south around September 20th set the stage for the rest of the month with active transitions in temperature and precipitation. As has been the trend in recent months these weather systems impacted far southern Indiana the most while leaving northern areas largely untouched.

This is evidenced in the total September precipitation which ranged from just 0.28 inch at Lafayette in west central Indiana to CoCoRaHS reports of 11.15 inches at Charlestown along the Ohio River. Two significant storm systems, one on September 20th and another on September 25th, transported lots of moisture and energy into southern Indiana. Flash flooding in Harrison, Clark, Jefferson, and Floyd counties caused the evacuation of some homes and stranded motorists in the same areas affected in early August. Unlike the August storms, the ground was not as saturated and damage was more limited than in the previous month.

September 1st – 9th

For this first report of September in Indiana, temperatures were slightly below the normal of 70.0 degrees F, with an average of 66.4 degrees F. The mean temperature deviation from September 1st to September 9th was 3.6 degrees F below the average temperatures expected for the state. Temperatures were cooler this week because of predominant northwesterly flow. The jet stream took a dive south, bringing with it cooler air from Canada, providing some relief from the warm temperatures we had experienced the week before. For most of the week the state was dominated by a high pressure system that was held into place by the wave train that stretched across the United States. Rainfall that moved into the region by the end of the week was a result of moisture transported from the south, coupled with a surface boundary that provided ample lift in the region to produce rain.

Precipitation in the state was below normal the first part of the week due to a high pressure center that pumped cooler, dry air into the region from Canada. On average the rainfall deviation was

-0.29 inch with the expected normal for the week at 0.89 inch of precipitation. This lack of rain the first part of the period was compensated for by above average rainfall the last several days due to winds shifting to the south and southwest. This wind shift allowed for moisture advection into Indiana and the evolution of a surface boundary that provided the lift needed to initiate rainfall. Brief, heavy rain showers fell on the evening of September 8th in the north central part of the state, helping to compensate for the dry spell earlier in the week, but still less than normal amounts. Overall for the interval of September 1st through September 9th, rainfall was still below normal for this time of year at 67 percent of average.

September 10th – 16th

Indiana saw a rather neutral weather pattern the week of September 10th through September 16th . Temperatures remained very close to the normals for this time of year with the deviation hovering within 1.5 degrees of the normal temperature. It was only towards the end of the week that a slight drop in temperatures resulted in slightly below normal levels for the state. When it comes to the numbers, the temperature deviation for the week was 0.5 degrees above normal, providing the state with pleasant conditions.

Precipitation has fallen off this past week, coming in below the normal for each day. The average deviation for the week from normal rainfall was -0.75.

The weather map was dominated again this week by high pressure systems over the Midwest and Lower Canada that brought us fair skies, little to no precipitation, and cooler temperatures moderated by northwesterly flow. A recent article from cattlenetwork.com highlights the grain outlook for the country, specifically for the corn crop. As of mid September corn in Illinois, Indiana, and Iowa are far behind normal in reaching the dent stage, and some growers are concerned that with the lack of heat (from the cooler, drier conditions) corn may not fully mature. Corn would then be harvested wet and require extended drying before storage.

September 17th – 23rd

The recent trend of near normal temperatures persisted into the first half of this week until the heat returned in the second half. Usually in mid September one would expect daily maximum temperatures from 75F to 80F degrees and minimums around 55F degrees in Indiana. The week began with average daily air temperatures locked in at 1F degree below normal as broad high pressure kept the weather quiet over Indiana and much of the country. This rather flat upper atmosphere wave pattern then buckled in the middle and amplified. Southerly winds in advance of an intensifying and expanding storm system pulled warm moist air northward into Indiana. The moisture was released in the form of heavy rain in southern Indiana late on September 20th ahead of yet another broad strong high pressure system. In the following days average daily temperatures jumped to as much as 13F degrees above normal. A cold front pushed through Indiana as the week came to a close.

The first few days of the week were dry statewide. The strong thunderstorms in midweek dumped nearly 6 inches of rain in far south central Indiana counties with about 2 inches more common elsewhere in the southern third of the state. Only a few tenths inch of rain fell in northern and

central Indiana during this storm. As the storm system departed light rain fell statewide each day to the close of the period. Total precipitation for the week was about 0.6 inch in northern and central Indiana with a typical range of 1.7 inch to 2.6 inches across the south outside the intense storm areas. Normally for this time in September one would expect approximately 0.75 inch of precipitation per week in Indiana.

The storm of the week occurred September 20th as training thunderstorms parked over south central Indiana. Harrison and Clark counties were hit hardest with Clarksville reporting 5.77 inches for the day on Sunday while Jefferson and Floyd counties reported flash flooding. In Clark and Floyd counties stranded motorists had to be rescued on Sunday evening and some residents evacuated from their homes. Despite the heavy rainfall the overall impact was less severe than the early August flood event in this same region. The rain in the current storm was spread over several hours and the ground was not saturated due to recent weeks of drier weather.

September 24th – 30th

A series of fronts in the area kept Indiana weather unsettled through September 28th. Temperatures which began the week well above normal slid all week long as progressively colder air worked its way into the state. A slow moving cut off low pressure system in the upper atmosphere over Kansas pumped warm moist air into Indiana, raising surface temperatures to 9F degrees above normal at the start of the week. This low pressure system gradually filled in and moved to the northeast, tapping into colder air behind it. By September 27th Indiana temperatures had returned to seasonal normals, then continued falling to 7F degrees below normal by week's end. A high pressure ridge moved in on September 30th, clearing the skies with calming winds. The season's first frost occurred in northeast and east central Indiana as October dawned.

Rainfall persisted until the last few days of the week. In recent weeks heavier rain amounts have fallen in far southern Indiana trending to lighter amounts in the north. This pattern continued this week as well as weekly totals averaged around 2.5 inches in southern Indiana, about 1 inch in central, and approximately 0.3 inch in northern sections. Storms on the evening of September 25th brought over an inch of rain to southern Indiana with as much as 2 inches reported near Bedford. After five days of clouds and rain, partly sunny skies finally returned on September 28th.

Minor flooding was a concern in south central Indiana in early morning on September 26th. Heavy rain was falling on already saturated ground which could cause smaller creeks to overflow and traffic to encounter flooded roadways.

September Summary

Temperature

Region	Temperature	Normal	Deviation
Northwest	64.2	64.6	-0.4
North Central	63.9	63.9	-0.1
Northeast	63.9	63.5	0.4

West Central	65.8	65.9	-0.1
Central	65.5	65.3	0.2
East Central	64.9	64.5	0.4
Southwest	68.6	68.2	0.4
South Central	67.4	67.5	-0.1
Southeast	66.9	66.9	0.0
State	65.8	65.7	0.1

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	0.95	3.21	-2.26	30
North Central	1.13	3.30	-2.17	34
Northeast	1.33	3.19	-1.87	42
West Central	1.41	3.03	-1.62	47
Central	2.31	2.99	-0.67	78
East Central	1.97	2.79	-0.82	71
Southwest	5.41	3.13	2.28	173
South Central	6.18	3.11	3.07	199
Southeast	5.08	2.97	2.10	171
State	2.87	3.09	-0.22	93

Autumn to date (same as September)

Temperature

Region	Temperature	Normal	Deviation
Northwest	64.2	64.6	-0.4
North Central	63.9	63.9	-0.1
Northeast	63.9	63.5	0.4
West Central	65.8	65.9	-0.1
Central	65.5	65.3	0.2
East Central	64.9	64.5	0.4
Southwest	68.6	68.2	0.4
South Central	67.4	67.5	-0.1
Southeast	66.9	66.9	0.0
State	65.8	65.7	0.1

Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	0.95	3.21	-2.26	30
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West Central	1.41	3.03	-1.62	47

Central	2.31	2.99	-0.67	78
East Central	1.97	2.79	-0.82	71
Southwest	5.41	3.13	2.28	173
South Central	6.18	3.11	3.07	199
Southeast	5.08	2.97	2.10	171
State	2.87	3.09	-0.22	93

Annual-to-date

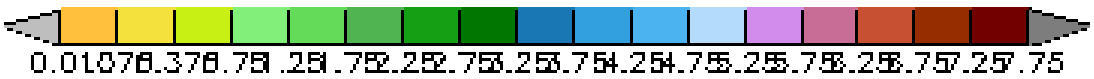
Temperature

Region	**Temperature**	**Normal**	**Deviation**
Northwest	52.2	53.5	-1.3
North Central	51.9	53.0	-1.1
Northeast	51.8	52.6	-0.8
West Central	54.4	55.1	-0.7
Central	54.1	54.6	-0.6
East Central	53.5	53.8	-0.3
Southwest	58.0	58.3	-0.3
South Central	56.6	57.7	-1.0
Southeast	56.1	56.8	-0.7
State	54.4	55.1	-0.7

Precipitation

Region	**Precipitation**	**Normal**	**Deviation**	**Percent of Normal**
Northwest	31.51	29.28	2.23	108
North Central	32.08	29.30	2.78	110
Northeast	31.43	28.34	3.09	111
West Central	35.65	31.77	3.88	112
Central	34.76	31.30	3.46	111
East Central	27.86	30.27	-2.42	92
Southwest	40.69	34.71	5.98	117
South Central	42.40	35.04	7.36	121
Southeast	38.71	34.02	4.68	114
State	35.34	31.63	3.71	112

Total Precipitation in Inches
September 1, 2009 to September 30, 2009



NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

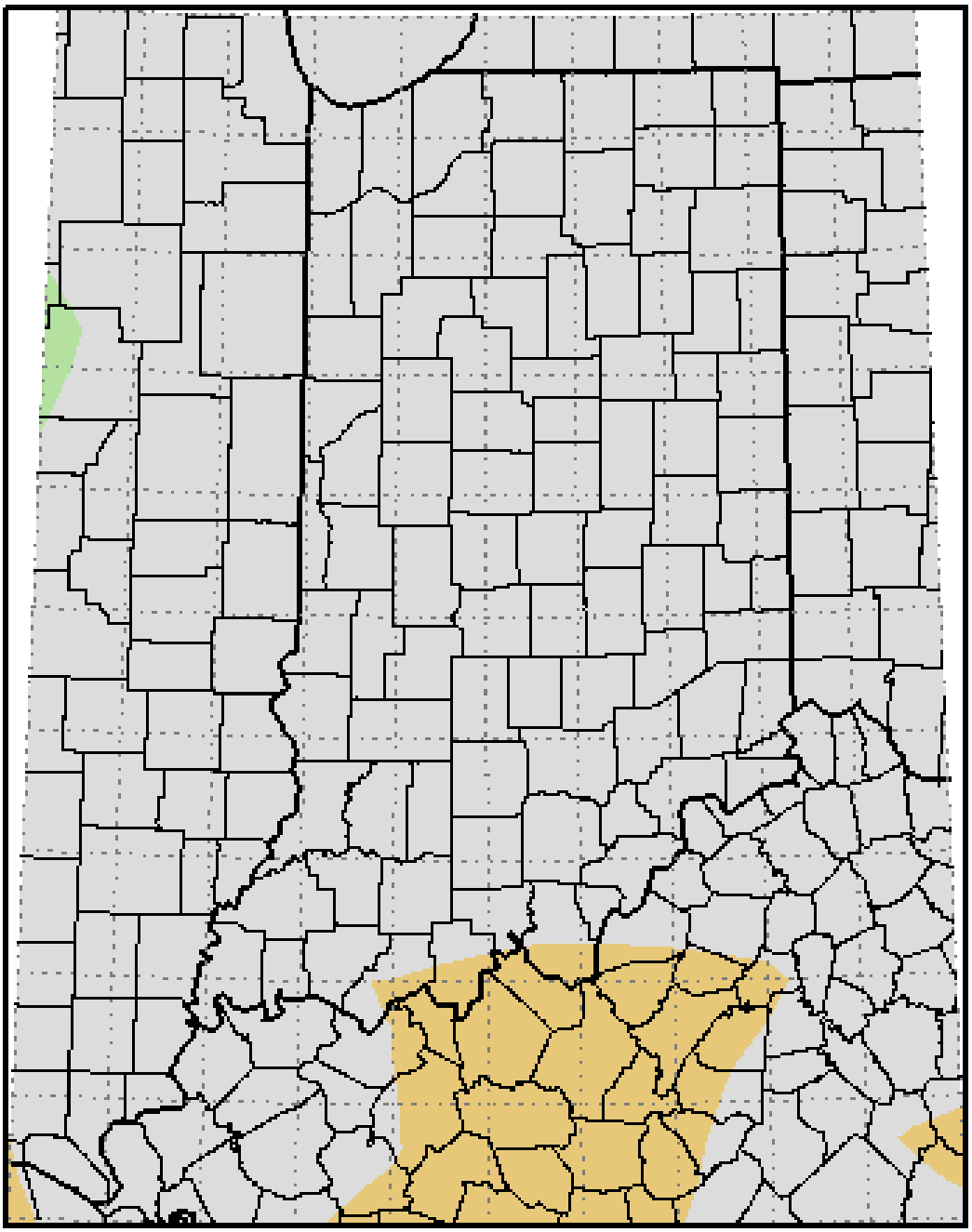
Total Precipitation Percent of Mean
September 1, 2009 to September 30, 2009

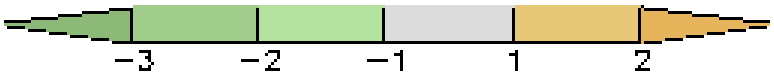
NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

Average Temperature Departure from Mean in Degrees F
September 1, 2009 to September 30, 2009





NOAA Midwestern 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, September 29th has 56.8% of Indiana under no drought, and 43.2% of Indiana under at *least* D0 through D4 drought status. This is followed by 3.5% 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 (39.7%) . 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.

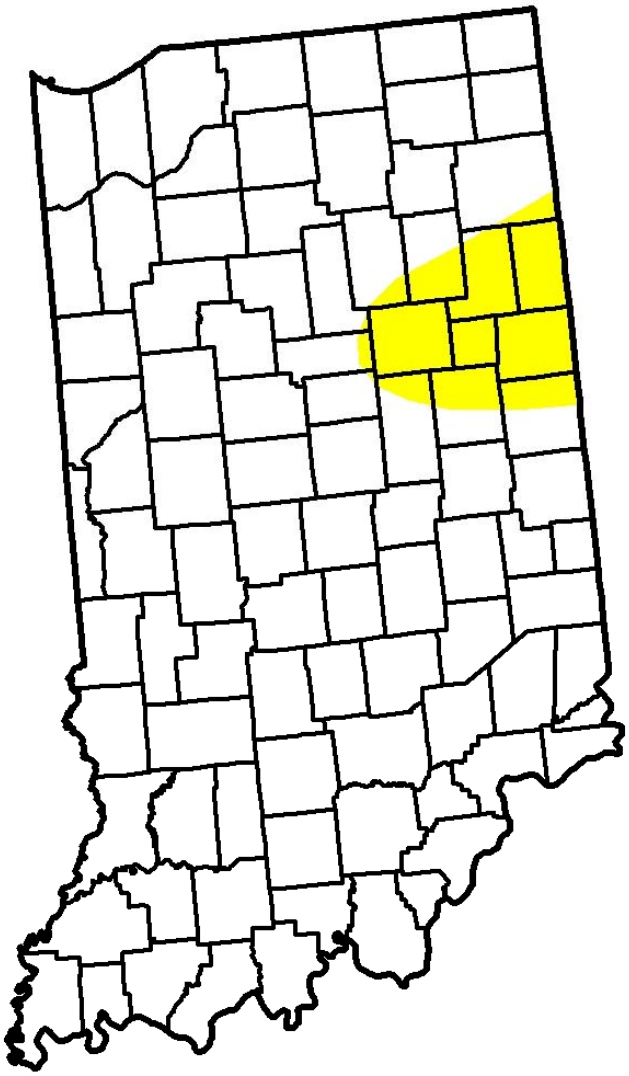
Intensity:

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

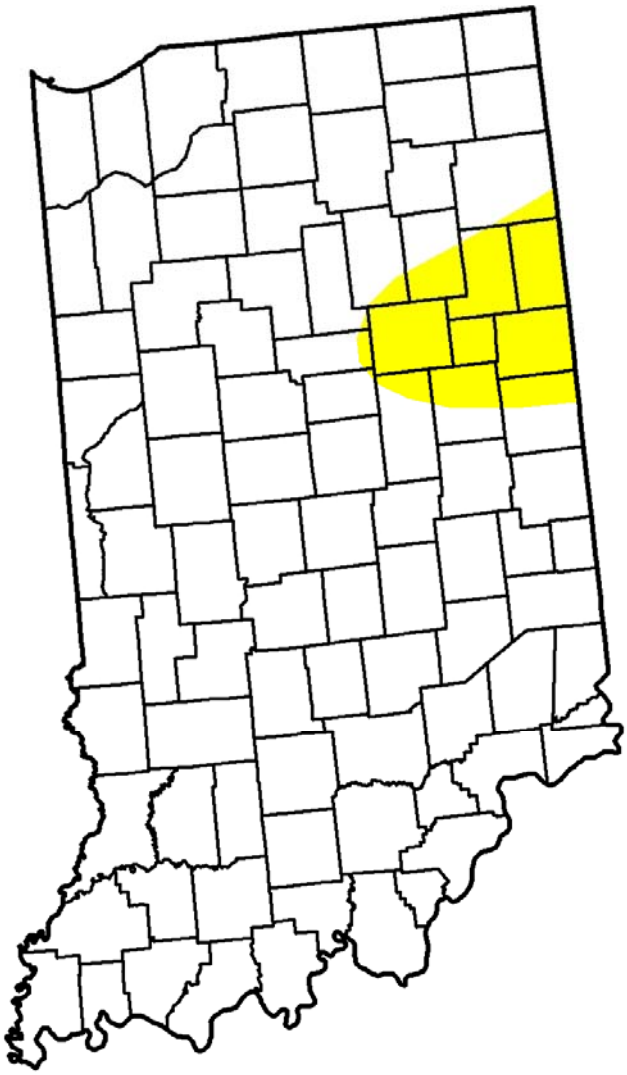
Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
09/29/09	56.79	43.21	3.48	0.00	0.00	0.00
09/22/09	69.03	30.97	3.78	0.00	0.00	0.00
09/15/09	92.99	7.02	0.00	0.00	0.00	0.00
09/08/09	92.99	7.02	0.00	0.00	0.00	0.00
09/01/09	100.00	0.00	0.00	0.00	0.00	0.00

September 1st Drought Summary

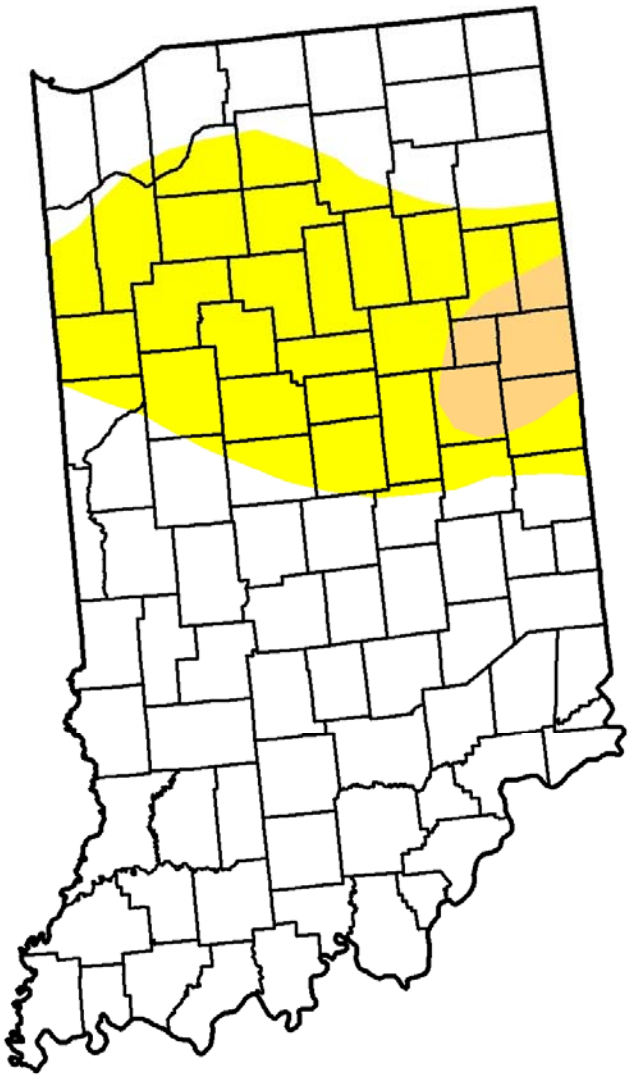
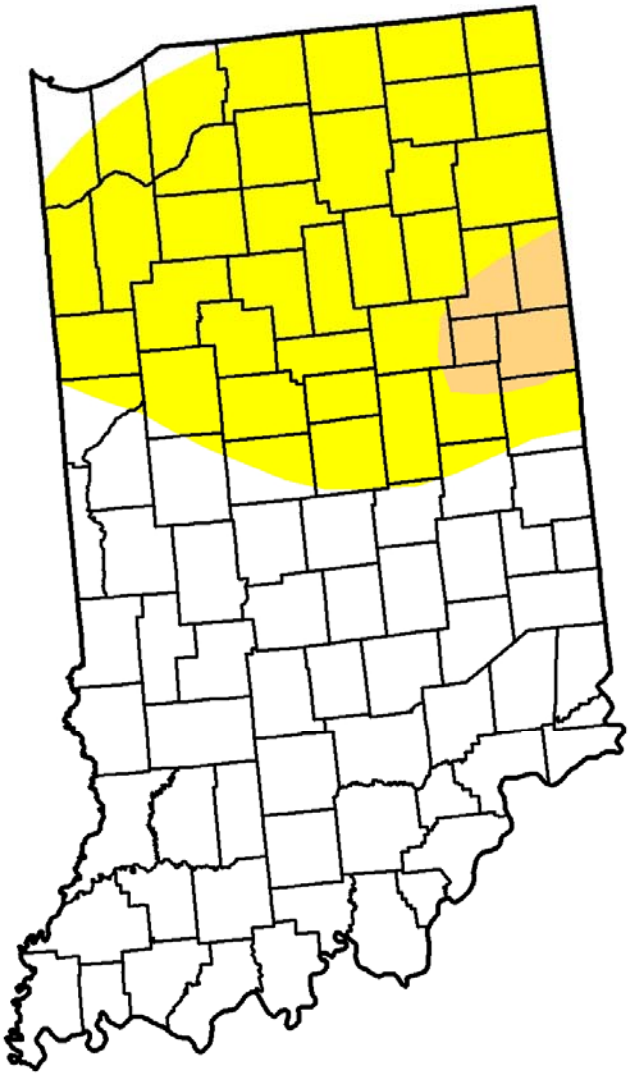
September 8th Drought Summary



September 15th Drought Summary



September 22nd Drought Summary



September 29th Drought Summary