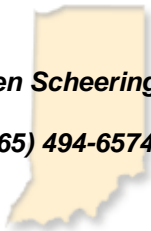


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## Indiana State Climate Office

### Monthly Weather Report



<http://www.iclimat.org>

**Aug 5, 2009**



## July 2009 Climate Summary

### Summary

July 2009 enters the weather record books as the coldest July on record in Indiana and in other Midwest states. Statewide temperature averages begin in 1895.

A persistent low pressure center positioned north of Indiana in tandem with the polar jet stream plunging southward from central Canada into the Midwest opened the door to cold air which poured almost non-stop into our region. The Canadian low center spun off a parade of cold fronts which reinforced the cold air already over Indiana, leaving little chance for warmer air to our south to recapture our state, even for a day. While a handful of southern Indiana cities did reach 90F degrees on a few days, most locations recorded none. Indeed most remarkable is that when averaged statewide for each July day, daily average temperatures remained below normal all 31 days of the month in Indiana. The 69.4F degree July 2009 state average temperature is 1.4F degrees colder than the runnerup: July 1947. Some other cold July's in Indiana were last year (25<sup>th</sup> coldest), 2007 (7<sup>th</sup> coldest), and 1996 (4<sup>th</sup> coldest). The state average temperature deviation for July 2009 was 5.2F degrees below normal.

Indiana July precipitation was heavy in the south but trended lighter moving northward. Total July rainfall averaged more than 6 inches across the southern third of the state with 8.7 inches recorded at Leavenworth. About 4 inches fell across central Indiana while 3 to 4 inches fell in the northern third of our state. These amounts are about 75 percent of normal in northern Indiana, just shy of normal in central sections, and more than 50 percent above normal in southern Indiana. Overall this places July 2009 in the top third of wettest Julys on record in Indiana.

### July 1<sup>st</sup> – 7<sup>th</sup>

A cold air mass which plunged into Indiana on June 28 settled in through the first week of July. Temperatures continued to fall as the month began, averaging 8F degrees below normal. Daily maximums peaked in the 70Fs, with minimums around 60F. A reinforcement of the cold air over the holiday weekend extended the cold spell with average statewide daily temperatures 9F below normal. The cold low pressure trough over the eastern part of the country slid to the Atlantic late in the week, flattening the jet stream path enough to allow a slight moderation of the cold weather. By the end of the period daily temperatures averaged about 3F degrees below normal statewide. This was an improvement but still cooler than what we would expect for early July in Indiana.

On average just under an inch of rain fell across Indiana the first seven days of July. This is about a quarter inch less than normal. Except for July 3<sup>rd</sup> and 4<sup>th</sup>, the rest of the week was nearly dry. East central Indiana received only about one-fourth the normal weekly rainfall. There are some early concerns for dry soil conditions in this area which bears watching in the weeks ahead.

### **July 8<sup>th</sup> – 14<sup>th</sup>**

An extended period of cold has now dominated Indiana weather since late last month. The second week of July opened with temperatures 7F degrees below normal as a pressure system north of Indiana held open the gateway to cold Canadian air. Meanwhile the dome of hot and humid air which visited Indiana a few weeks ago is still cooking in the Southwest states. This hot dome made a move towards Indiana in the middle of this second week but stalled as it met up with the resident cold air mass. A little mixing of the two contrasting air masses did occur and managed to raise Indiana temperatures to just one degree below normal by July 10. A new cold front then arrived on July 12 and reinforced the cold pattern, once again dropping Indiana statewide average temperatures to 8F degrees below normal. A slight warmup was underway at the close of this second week. Normal July maximum temperatures this week are near 85 and minimums around 65.

Near normal rainfall amounts fell the first half of the week on average around Indiana, then peaked to 0.3 inch above normal as the cold front arrived on July 12. The remainder of the period was mostly dry statewide as the cold Canadian air contained very little moisture. Overall this second week of July averaged 0.8 inch of rain statewide, which is about 0.1 inch below or 85 percent of normal for the week. A few central Indiana locations had more than 2 inches in heavier thunderstorms.

The cool July so far is helpful to the Indiana corn crop. While the cooler temperatures have slowed growth progress somewhat, the cooler temperatures are ideal to promote successful pollination which typically occurs this month.

### **July 15<sup>th</sup> – 21<sup>st</sup>**

The unusually persistent cold spell rolled on through yet another July week. No July days this year so far have posted an Indiana daily average temperature above normal! At this time of year daily maximum temperatures should reach the middle 80s and minimums in the mid 60s. At the start of the period temperatures moderated a bit as a departing high pressure area coupled with an advancing strong low pressure system transported warmer air towards Indiana. Temperatures climbed to within 2F degrees below normal on July 15 but then a strong cold front halted the warm up. As the week progressed the cold actually intensified. A second cold front reinforced the cold air mass over Indiana on July 17, plunging daily average temperatures to 12F degrees below normal. The cold moderated slowly the rest of the week, as temperatures rose to 8F degrees below normal with the approach of a new warm front.

Not surprisingly precipitation was lighter than normal for the week in the cold air. Amounts generally totaled from 0.4 inch to 1.3 inch with most of this falling early in the period with the passage of the strong cold fronts. Around a quarter inch of rain per day the first half of the week was followed by nearly dry weather the rest of the period.

Heavy rain fell in Evansville on July 17 but storms were intense in Fort Wayne two days later. Up to 1.5 inch fell in two hours in Fort Wayne during the Three Rivers Festival, causing air pockets to form within storm sewers below downtown city streets. These air pockets blew open manholes, creating small geysers. Traffic flow in the area was confused for the duration of the storm.

**July 22<sup>nd</sup> – 31<sup>st</sup>**

The month of July began, continued, and has now ended with remarkable extended cold. A region of deep low pressure north of Indiana continues to spin off new cold fronts at a rapid pace, about every other day. These cold fronts reinforce the abnormal cold already over Indiana before the local atmosphere has a chance to rebound to normal July temperatures. The start of this week saw temperatures 10F degrees below normal, moderating slightly to 5F degrees on the cool side of normal through the next four days. By July 27 temperatures had nearly recovered to within a degree of normal. Then another cold front arrived on July 29, lowering temperatures once again to 4F degrees below the typical July range of maximums in the mid 80s and lows in the mid 60s.

Rainfall during the week was heavy in southern Indiana with 3 to 5 inch totals, three to four times the amount typical for this period in July. One to two inches fell in central Indiana while a little more than an inch fell in the north. Rain fell somewhere in Indiana each day as a series of cold fronts kept the weather unsettled.

**July Summary**

**Temperature**

<b>Region</b>	<b>Temperature</b>	<b>Normal</b>	<b>Deviation</b>
Northwest	68.4	73.6	-5.3
North Central	67.9	73.1	-5.2
Northeast	68.0	72.8	-4.8
West Central	69.4	74.8	-5.4
Central	68.9	74.3	-5.3
East Central	68.8	73.5	-4.7
Southwest	72.1	77.1	-5.0
South Central	70.6	76.3	-5.7
Southeast	70.2	75.5	-5.3
<b>State</b>	<b>69.4</b>	<b>74.6</b>	<b>-5.2</b>

### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	3.03	3.86	-0.83	78
North Central	2.72	3.80	-1.08	72
Northeast	2.77	3.66	-0.89	76
West Central	4.33	4.39	-0.06	99
Central	4.16	4.26	-0.10	98
East Central	3.47	4.10	-0.63	85
Southwest	6.32	4.26	2.06	148
South Central	6.66	4.32	2.34	154
Southeast	6.52	4.12	2.40	158
<b>State</b>	<b>4.46</b>	<b>4.10</b>	<b>0.36</b>	<b>109</b>

### Summer to date

#### Temperature

Region	Temperature	Normal	Deviation
Northwest	69.2	71.9	-2.7
North Central	68.6	71.3	-2.7
Northeast	68.6	71.0	-2.4
West Central	70.9	73.1	-2.2
Central	70.3	72.5	-2.2
East Central	69.9	71.7	-1.8
Southwest	73.8	75.2	-1.4
South Central	72.2	74.4	-2.2
Southeast	71.5	73.5	-2.1
<b>State</b>	<b>70.6</b>	<b>72.8</b>	<b>-2.2</b>

#### Precipitation

Region	Precipitation	Normal	Deviation	Percent of Normal
Northwest	7.39	8.20	-0.81	90
North Central	6.96	8.10	-1.14	86
Northeast	6.79	7.74	-0.95	88
West Central	9.70	8.72	0.98	111
Central	9.62	8.36	1.26	115
East Central	8.29	8.33	-0.04	99
Southwest	11.04	8.37	2.67	132
South Central	11.74	8.41	3.33	140
Southeast	12.32	8.34	3.99	148
<b>State</b>	<b>9.35</b>	<b>8.30</b>	<b>1.05</b>	<b>113</b>

## Annual-to-date

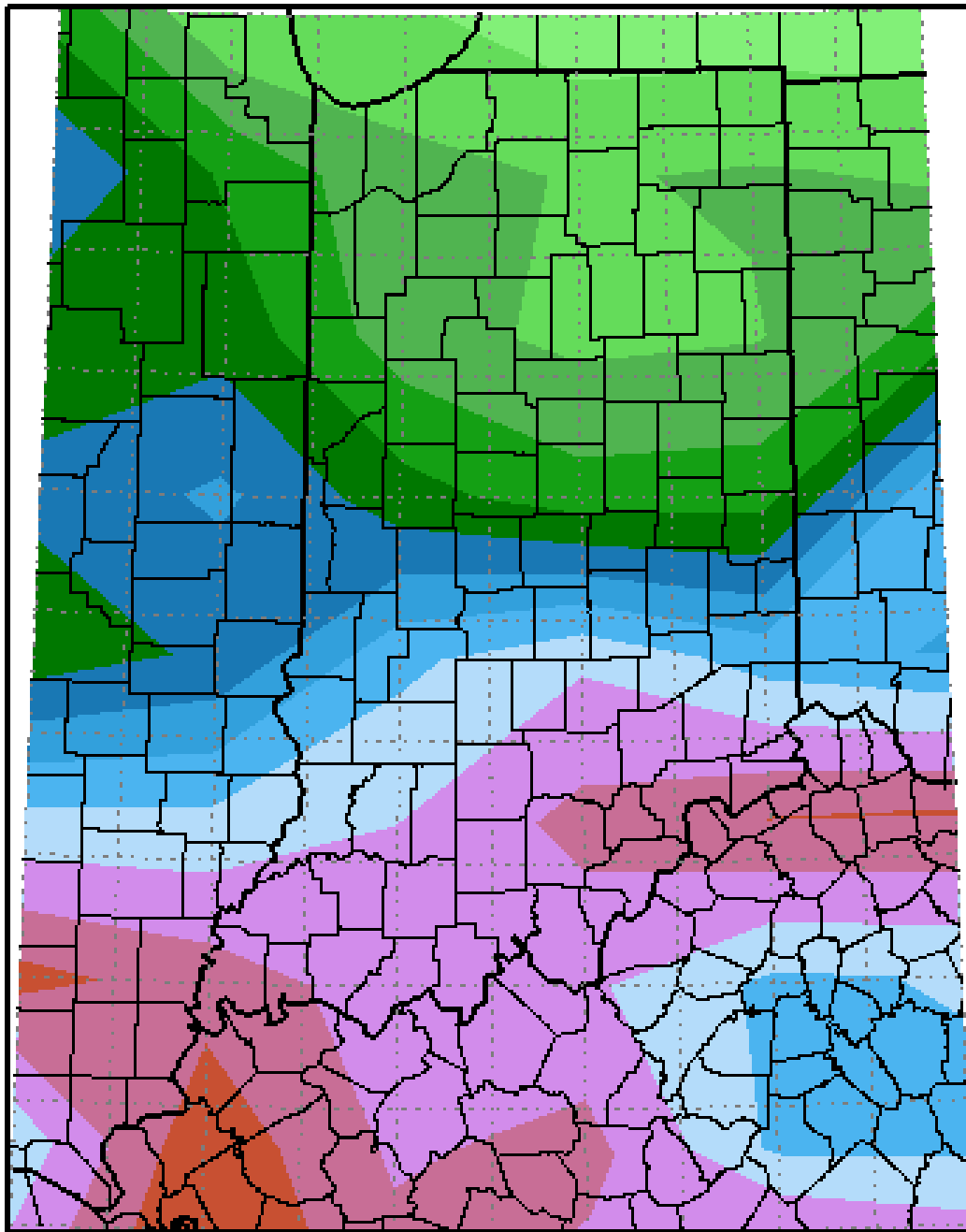
### Temperature

<b>Region</b>	<b>Temperature</b>	<b>Normal</b>	<b>Deviation</b>
Northwest	48.0	49.2	-1.2
North Central	47.7	48.8	-1.1
Northeast	47.5	48.4	-0.9
West Central	50.4	51.0	-0.6
Central	50.1	50.6	-0.5
East Central	49.5	49.7	-0.2
Southwest	54.2	54.4	-0.2
South Central	52.8	53.8	-1.0
Southeast	52.3	52.9	-0.6
<b>State</b>	50.4	51.1	-0.7

### Precipitation

<b>Region</b>	<b>Precipitation</b>	<b>Normal</b>	<b>Deviation</b>	<b>Percent of Normal</b>
Northwest	26.50	22.25	4.25	119
North Central	25.93	22.17	3.76	117
Northeast	25.54	21.46	4.07	119
West Central	30.02	24.78	5.24	121
Central	28.51	24.56	3.95	116
East Central	22.94	23.93	-0.99	96
Southwest	32.95	27.91	5.04	118
South Central	33.06	28.02	5.05	118
Southeast	30.12	27.15	2.96	111
<b>State</b>	28.72	24.75	3.97	116

# Total Precipitation in Inches July 1, 2009 to July 31, 2009

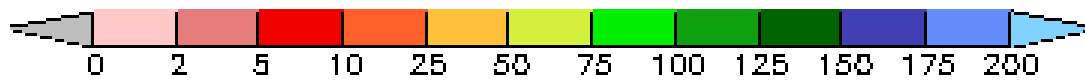
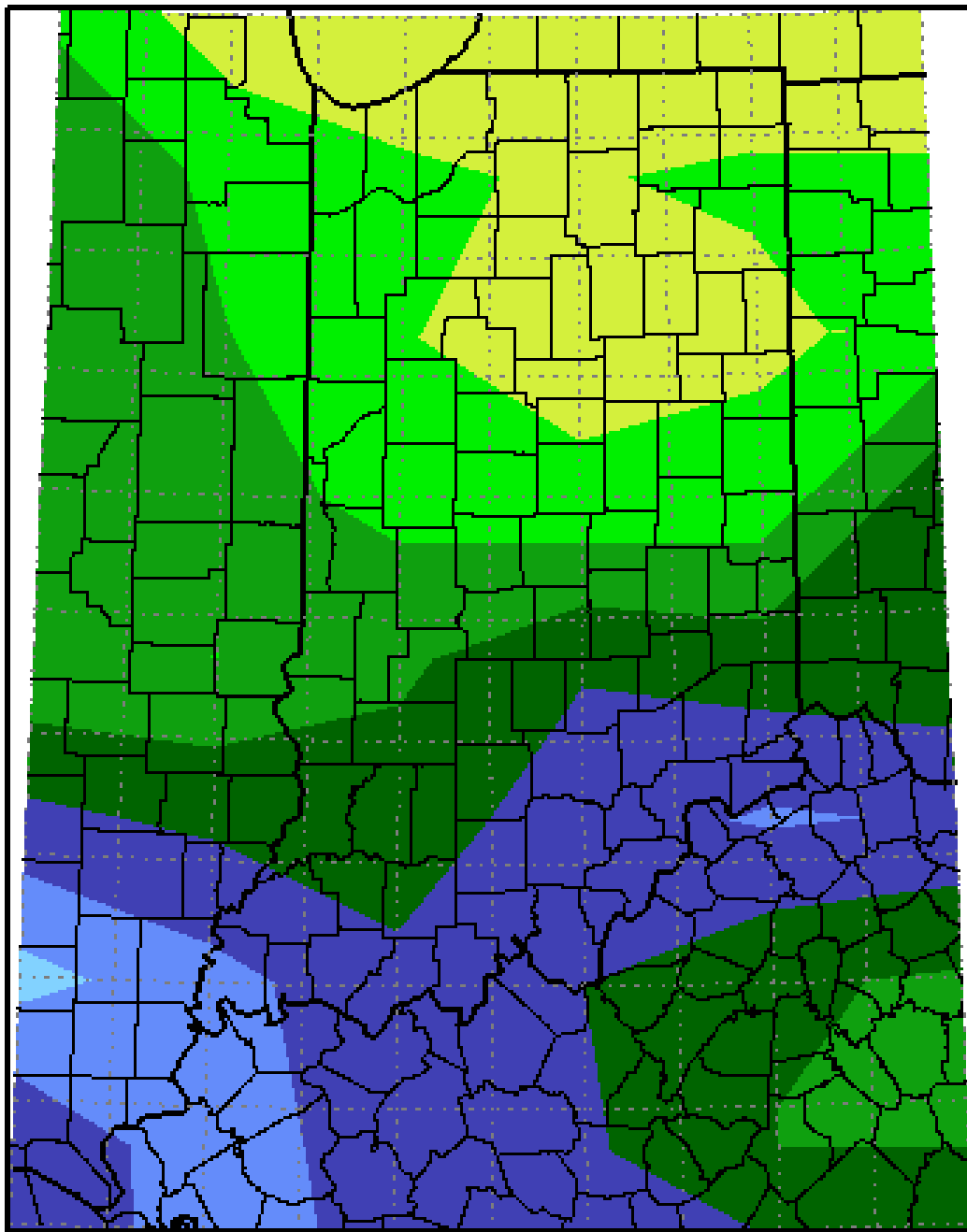


NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

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

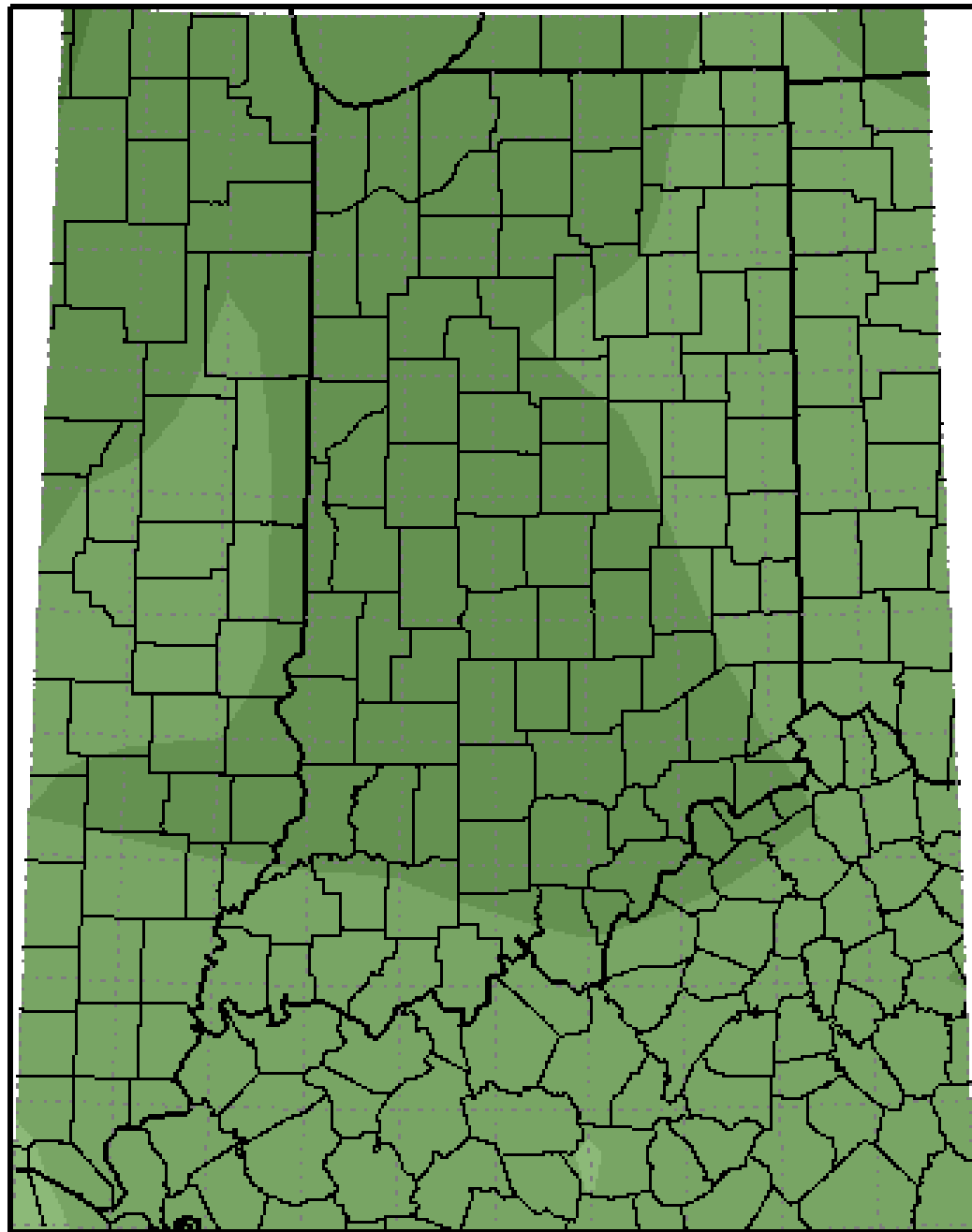


NOAA Midwestern Regional Climate Center

Illinois State Water Survey

Champaign, Illinois

Average Temperature Departure from Mean in Degrees F  
July 1, 2009 to July 31, 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, July 28<sup>th</sup> 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	
<b>Week</b>	<b>None</b>	<b>D0-D4</b>	<b>D1-D4</b>	<b>D2-D4</b>	<b>D3-D4</b>	<b>D4</b>
07/28/09	100.00	0.00	0.00	0.00	0.00	0.00
07/21/09	100.00	0.00	0.00	0.00	0.00	0.00
07/14/09	100.00	0.00	0.00	0.00	0.00	0.00
07/07/09	100.00	0.00	0.00	0.00	0.00	0.00

*July 7<sup>th</sup> Drought Summary*



*July 14<sup>th</sup> Drought Summary*



*July 21<sup>st</sup> Drought Summary*



*July 28<sup>th</sup> Drought Summary*

