

KANSAS CLIMATE SUMMARY AND DROUGHT REPORT

Current Conditions, Drought Impacts and Outlook

February 2009

February was Generally Dry and Very Mild

February 2009 was the fourth consecutive dry month on a statewide basis, with an average total precipitation of 0.50 inches. Several locations reported no precipitation during the month. A storm system clipped southeast Kansas on February 10-11 with over 2 inches of rain in some locations, leading to slightly above normal monthly totals in that part of the state. Nearly the entire state has received less than 70 percent of normal precipitation over the winter (December – February), with much of the southwest receiving less than 25 percent of normal.

Moderate Drought is now depicted by the U.S. Drought Monitor in 20 southwest or south central Kansas counties. The Cimarron National Grassland in Morton County is reporting extensive soil erosion due to wind and drought-killed grass. Some 10,000 acres out of a total of 108,000 acres has been blown-out. In some places, only sagebrush and yucca are left to hold the soil.

February continued the mild weather pattern that began during January, with average monthly temperatures running more than 5 degrees above normal in many locations. Overall, this was the warmest February since 2000 and the 14th warmest since statewide records began in 1895. The coldest temperature reported during February was 1 above at Portis and Smith Center, while Ashland hit 83 for the state's high. Record daily high temperatures were equaled or surpassed at many spots across the state on February 6th.

Major wildfires have been reported from nine Kansas counties in 2009, well above the number expected at this time of year. Dry, heavy fuel loadings are a contributing factor.

CURRENT COUNTY DROUGHT STAGES

No declarations are presently in effect. The overall moisture situation across the state will be assessed as the growing season begins this spring, including the need for any county drought stage declarations.

DROUGHT MONITORING AND INDICES

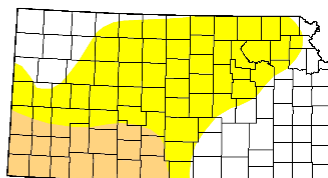
The U.S. Drought Monitor is perhaps the most widely recognized drought monitoring tool in the nation. The Monitor ([current map](#)) is a composite of several observed weather variables and drought indices that is updated weekly.

U.S. Drought Monitor

Kansas

March 3, 2009
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	36.3	63.7	16.5	0.0	0.0	0.0
Last Week (02/24/2009 map)	76.6	23.4	16.5	0.0	0.0	0.0
3 Months Ago (12/09/2008 map)	94.3	5.7	0.7	0.0	0.0	0.0
Start of Calendar Year (01/06/2009 map)	94.4	5.6	0.7	0.0	0.0	0.0
Start of Winter Year (11/07/2008 map)	84.6	15.4	7.7	1.1	0.0	0.0
One Year Ago (03/04/2008 map)	64.7	35.3	4.8	0.0	0.0	0.0



Intensity:

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

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

<http://drought.unl.edu/dm>



Released Thursday, March 5, 2009

Author: J. Lawrimore/L. Love-Brotak, NOAA/NESDIS/NCDC

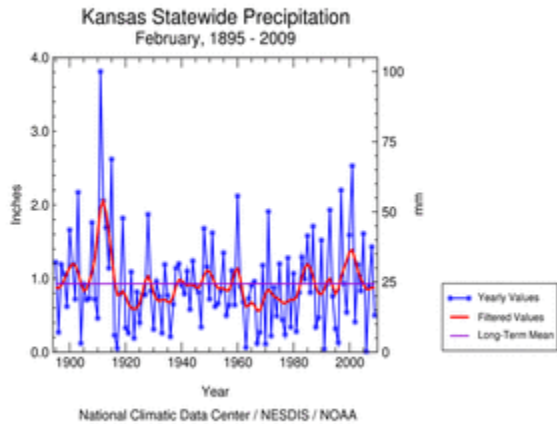
The March 3rd map shows moderate drought across roughly the southwest quarter of Kansas, with abnormally dry conditions extending nearly to the northeast corner of the state. This represents a large increase during the past four weeks in the area depicted as being in abnormally dry or drought conditions. On February 3rd, abnormally dry conditions were depicted for roughly the area now shown in moderate drought. Moderate drought was restricted to a small area of extreme southwest Kansas at that time.

The table accompanying the map compares the percentage of the state currently affected by drought conditions with several points during the past year.

In the Kansas county drought stage scheme, a Drought Watch equates to moderate drought in the U.S. Drought Monitor, while a Drought Warning is the equivalent of severe drought. A Drought Emergency is reserved for extreme or exceptional drought.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The statewide average PDSI for the week ending February 28th was 2.35 (unusually moist), similar to the January 31st value of 2.62 (unusually moist). Divisional PDSI values ranged from extremely moist in the north central (4.01), down to 0.65 and 0.57 (incipient moist spell) in the southwest and west central divisions, respectively.

February Conditions



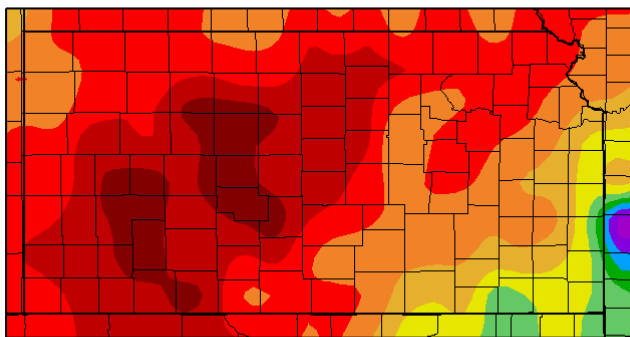
February 2009 ranks as the 31st driest February on record (1895-2009) in Kansas with a statewide average total precipitation of 0.50 inches (see Table 1). This is 55 percent of normal. The graph at the left shows February precipitation in this long-term perspective. The monthly statewide [moisture status](#) graphs and rankings are available from the National Climatic Data Center.

Based on preliminary reports from National Weather Service COOP network stations, the greatest total precipitation received in February was 2.47 inches at Independence in Montgomery County. Columbus, Fort Scott and Pittsburg also topped the two-inch mark. Tops for the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) was 2.54 inches at Liberty 3.2 WNW in Montgomery County.

Several other CoCoRaHS observers in Bourbon, Crawford and Montgomery counties also reported more than two inches during February.

Among COOP stations, Kinsley and Meade reported no precipitation during February, while several CoCoRaHS stations (particularly in Gray, Edwards, Ellis, Ellsworth and Russell counties) were shut-out as well. The maps below show total precipitation received and the percent of normal across the state in February.

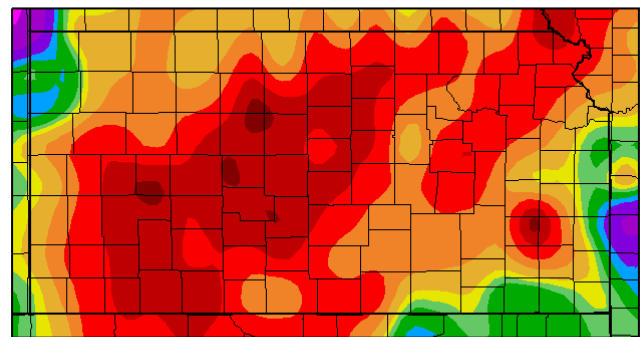
Precipitation (in)
2/1/2009 – 2/28/2009



Generated 3/2/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
2/1/2009 – 2/28/2009



Generated 3/2/2009 at HPRCC using provisional data.

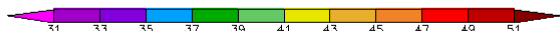
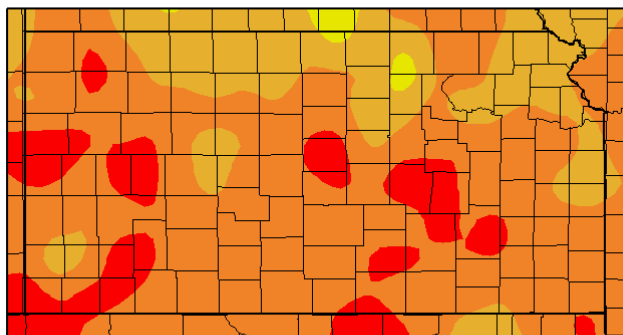
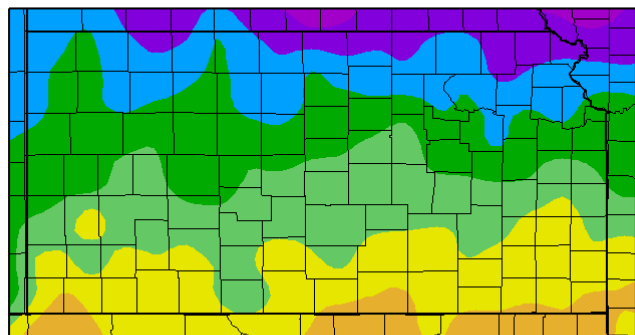
NOAA Regional Climate Centers

The following maps show average monthly temperature and the departure from normal across Kansas during February. The month averaged well above normal nearly everywhere; no subzero temperatures were recorded in the state. The statewide February average temperature of 39.5^o F was 5.0 degrees above normal, making this the warmest February since 2000. Only 13 previous Februarys since 1895 were warmer.

Temperatures soared into the low-80s at several locations in central and western Kansas on February 6 and 7. Ashland (Clark County) hit 83°F on the 7th for the month's high. Daily record highs were tied or broken at Garden City, Dodge City, Medicine Lodge, Wichita, Topeka and Chanute on February 6th. The lowest temperature reported during February was a comparatively mild +1° F on the 28th at Portis (Osborne County) and Smith Center (Smith County). State record temperature extremes for February are 92° F at Aetna in 1981 and -40° F at Lebanon in 1905.

Temperature (F)
2/1/2009 - 2/28/2009

Departure from Normal Temperature (F)
2/1/2009 - 2/28/2009



Generated 3/2/2009 at HPRDC using provisional data.

NOAA Regional Climate Centers

Generated 3/2/2009 at HPRDC using provisional data.

NOAA Regional Climate Centers

Table 1 summarizes February temperature and precipitation conditions by climate division while Appendix A provides a February summary for principal reporting locations within and adjacent to Kansas. Please note that the data used in compiling Tables 1 and 2 and in Appendix A is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

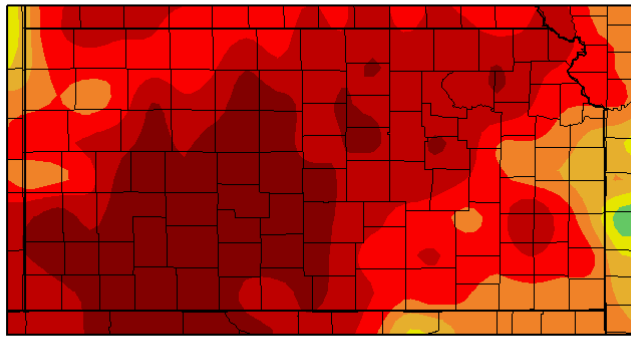
Division	Precipitation (inches)						Temperature (°F)			
	February			Annual 2009			Average	Dep. ¹	Monthly Extreme (Day)	
	Total	Dep. ¹	% Norm	Total	Dep. ¹	% Norm			Highest	Lowest
Northwest	0.39	-0.03	93	0.45	-0.36	56	36.0	3.9	78 (7)	3 (28)
West Central	0.22	-0.26	46	0.32	-0.57	36	38.4	5.4	81 (7)	5 (28)
Southwest	0.16	-0.34	32	0.18	-0.70	20	40.9	5.9	83 (7)	7 (15)
North Central	0.28	-0.37	43	0.29	-0.89	25	35.9	5.0	76 (7)	1 (28)
Central	0.31	-0.49	39	0.34	-1.08	24	38.8	5.8	80 (7)	3 (28)
South Central	0.50	-0.40	56	0.55	-1.01	35	41.0	5.8	81 (7)	6 (28)
Northeast	0.50	-0.37	57	0.57	-1.16	33	36.3	5.4	73 (1)	2 (4)
East Central	0.67	-0.31	68	0.72	-1.29	36	38.6	5.9	74 (8)	5 (4)
Southeast	1.43	0.11	108	1.48	-1.01	59	41.6	6.1	75 (27)	7 (4)
STATE	0.50	-0.28	64	0.55	-0.90	38	39.0	5.6	83 (7)	1 (28)

1. Departure from 1971-2000 normal value
Source: KSU Weather Data Library

Longer-Term Precipitation Trends

The following two maps show the percentage of normal precipitation received across Kansas during the past three months (December 2008 - February 2009) and during the past 12 months (March 2008 - February 2009). Total precipitation has been less than 70 percent of normal across nearly the entire state since December 1st, with much of the southwest quarter receiving less than 25 percent. Long term, persistent dryness in southwest Kansas stands-out on the 12-month map. Northeast Kansas has also received somewhat below normal precipitation during the past year.

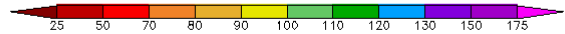
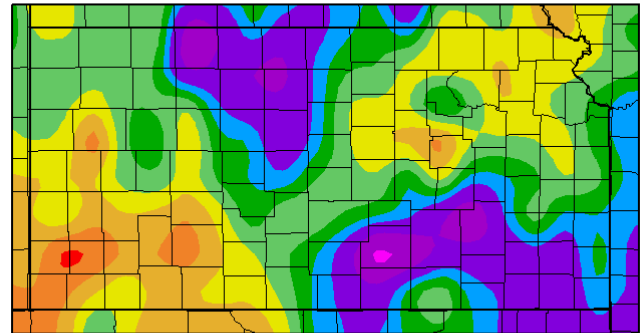
Percent of Normal Precipitation (%)
12/1/2008 - 2/28/2009



Generated 3/2/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
3/1/2008 - 2/28/2009



Generated 3/2/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Radar-based [precipitation estimate maps](#) covering multiple time periods are available from the National Weather Service. These maps are updated daily. Monthly and annual individual station and county average [precipitation data](#) is available from the Weather Data Library at Kansas State University.

Table 2 provides additional perspective on Kansas statewide temperature and precipitation trends over the past 12 months.

Month	Temperature (°F)		Precipitation (inches)		
	Monthly Average	Departure ¹	Monthly Total	Departure ¹	Percent Normal ¹
March 2008	42.8	-1.0	1.56	-0.69	69
April 2008	50.1	-3.5	2.71	0.12	105
May 2008	62.7	-0.6	5.53	1.35	132
June 2008	73.7	0.3	5.00	1.12	129
July 2008	78.4	-0.4	3.70	0.09	102
August 2008	75.0	-1.9	4.22	1.06	134
September 2008	66.0	-2.0	4.06	1.38	151
October 2008	55.1	-1.1	4.60	2.42	211
November 2008	43.8	2.0	0.95	-0.78	55
December 2008	29.3	-2.6	0.66	-0.32	67
January 2009	30.9	2.1	0.08	-0.69	10
February 2009	39.5	5.0	0.50	-0.41	55
Past 3 Months	---	---	1.24	-1.42	47
Past 6 Months	---	---	10.85	1.60	117
Past Year	---	---	33.57	4.65	116

1. Departure from 1971-2000 normal value
Source: NOAA National Climatic Data Center

DROUGHT IMPACTS AND RESPONSE

Agriculture

The [Kansas Crop and Weather Report](#) is updated weekly during the growing season. Included is information about crop conditions and progress, soil moisture conditions, range and pasture conditions, hay and pasture supplies and stock water supplies.

The most recent Report, released March 2nd, rated statewide topsoil moisture as 66 percent short-very short compared with 49 percent short-very short one month ago and only 16 percent short-very short at this time last year. The southwest district reported topsoil moisture as 99 percent short-very short, with the west central and south central coming in at 88 and 85 percent short-very short, respectively. Subsoil moisture was rated 38 percent short-very short, 60 percent adequate and 2 percent surplus, statewide.

Statewide, hay and forage supplies were rated 83 percent adequate, while feed grain supplies were rated 88 percent adequate. Wheat condition is rated 15 percent poor-very poor, 35 percent fair, 45 percent good and 5 percent excellent.

On March 4th, Governor Kathleen Sebelius requested that U.S. Secretary of Agriculture Tom Vilsack declare Scott County an agricultural disaster area. This request is based upon continuing crop production losses due to drought and high winds dating back to January 1, 2008. A secretarial disaster designation would make farmers and ranchers eligible for low-interest loans through the USDA Farm Service Agency.

Streamflow and Reservoir Levels

The U.S. Geological Survey [Kansas Drought Watch](#) provides information on 7-day average streamflow measured at long-term gaging stations and how they compare to normal flows. Most of these gages are located in central and eastern Kansas. A map (click on National Drought Map and then on Kansas) identifies river basins experiencing below normal flows and hydrologic drought.

Seven-day average streamflow was below normal (<25th percentile) at 7 percent of Kansas' long-term gaging stations on February 28th; the January 31st value was 8 percent. Normally about 25 percent of gages are below normal at any given time.

As of February 25, 2009, no streams were under minimum desirable streamflow (MDS) administration by the Kansas Department of Agriculture - Division of Water Resources. Flow in most streams is well above the MDS target level. Currently, it does not appear that the criteria for MDS administration on the Republican River at either Concordia or Clay Center will be met until late March at the earliest.

Table 3 summarizes federal reservoir pool elevations on February 27, 2009 in terms of departure from the top of the conservation/multipurpose pool and pool elevation change since January 30th.

Table 3 Kansas Federal Reservoir Pool Elevation Summary					
Reservoir	Top MP/C Pool ¹	Pool Elevation (Feet MSL)		02/27/2009	
		01/30/09	02/27/09	Departure from Top ²	Change from 01/30/2009 ²
Kansas River Basin					
Norton	2304.3	2294.0	2294.2	-10.1	0.2
Harlan County, NE	1946.0	1946.1	1946.1	0.1	0.0
Lovewell	1582.6	1581.9	1582.6	0.0	0.7
Milford	1144.4	1142.9	1142.8	-1.6	-0.1
Cedar Bluff	2144.0	2127.4	2127.3	-16.7	-0.1
Kanopolis	1463.0	1463.0	1463.1	0.1	0.1
Wilson	1516.0	1516.2	1516.1	0.1	-0.1
Webster	1892.5	1891.5	1892.3	-0.2	0.8
Kirwin	1729.3	1727.9	1728.5	-0.8	0.6

Waconda	1455.6	1454.1	1454.1	-1.5	0.0
Tuttle Creek	1075.0	1078.2	1071.9	-3.1	-6.3
Perry	891.5	889.7	889.8	-1.7	0.1
Clinton	875.5	875.5	875.6	0.1	0.1
Melvern	1036.0	1034.1	1034.1	-1.9	0.0
Pomona	974.0	972.4	972.1	-1.9	-0.3
Hillsdale	917.0	915.3	915.3	-1.7	0.0
Arkansas River Basin					
Cheney	1421.6	1421.7	1421.7	0.1	0.0
El Dorado	1339.0	1339.0	1339.0	0.0	0.0
Toronto	899.5	899.5	900.1	0.6	0.6
Fall River	946.5	946.7	947.0	0.5	0.3
Elk City	794.0	799.6	795.7	1.7	-3.9
Big Hill	858.0	858.0	858.2	0.2	0.2
Council Grove	1272.5	1274.0	1272.5	0.0	-1.5
Marion	1348.5	1348.6	1348.6	0.1	0.0
J. Redmond	1039.1	1040.9	1039.3	0.2	-1.6
1. Seasonal pool operation at El Dorado, Toronto, Fall River, Elk City, Council Grove and John Redmond reservoirs. 2. All values are in feet. Negative departures or changes are shown in red. Source: U.S. Army Corps of Engineers					

Public Water Systems

No drought-related public water system impacts are currently being reported.

Several publications provide guidance regarding drought preparedness and response. The [2007 Municipal Water Conservation Plan Guidelines](#) replace previous guidelines dating back to 1990. These guidelines cover drought response in addition to long-term water conservation.

The [Drought Vulnerability Assessment Report](#) identifies those systems most likely to first be impacted by drought and the reason for their vulnerability. It was updated in 2007 to reflect system conditions as of 2006.

[Responding to Drought: A Guide for City, County and Water System Officials](#) provides an overview of Kansas county drought stage declarations, local planning and coordination, disaster declarations, and available state and federal assistance.

Vegetation Conditions

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a [Kansas Green Report](#) each week during the growing season. This report consists of a set of five interactive maps derived from satellite and historic data that illustrate vegetation conditions and crop progress across the state.

A Vegetation Condition Index Map, included in the Green Report, illustrates vegetation health and levels of plant stress based on current and historic vegetation greenness and surface temperatures. Map production will resume following vegetation green-up this spring.

Fire

Major wildfires have been reported from nine Kansas counties so far this year. Counties reporting major fires include Butler, Cowley, Dickinson, Doniphan, Greenwood, Leavenworth, Ottawa, Pottawatomie and Riley. This frequency of large fires so early in the season is far above average. Heavy fuel loading and dry fuels are contributing factors.

The Kansas Interagency Wildfire Council held a conference call on March 3rd and will continue such calls on a weekly basis through the remainder of the fire season. The Council seeks to coordinate efforts among its members related to incident management, asset sharing and other matters. Members include agencies with wildland fire suppression or support responsibilities including the Kansas Forest Service, U.S. Forest Service, U.S. Fish and Wildlife Service, the National Park Service, the Natural Resources Conservation Service and the Bureau of Land Management. The National Weather Service, State Climatologist's Office and the Kansas Division of Emergency Management also are involved.

The [Wildland Fire Outlook](#) issued by the National Interagency Fire Center on March 2nd foresees an above normal significant wildfire potential across nearly all of Kansas during March and until the spring green-up occurs. Abundant fine fuel availability and below normal precipitation this winter, combined with the drought and recent precipitation deficits that already exist are cited for this increased fire risk. Significant fire potential is defined as the likelihood that a wildfire will require mobilization of additional resources from outside the area in which the fire originated.

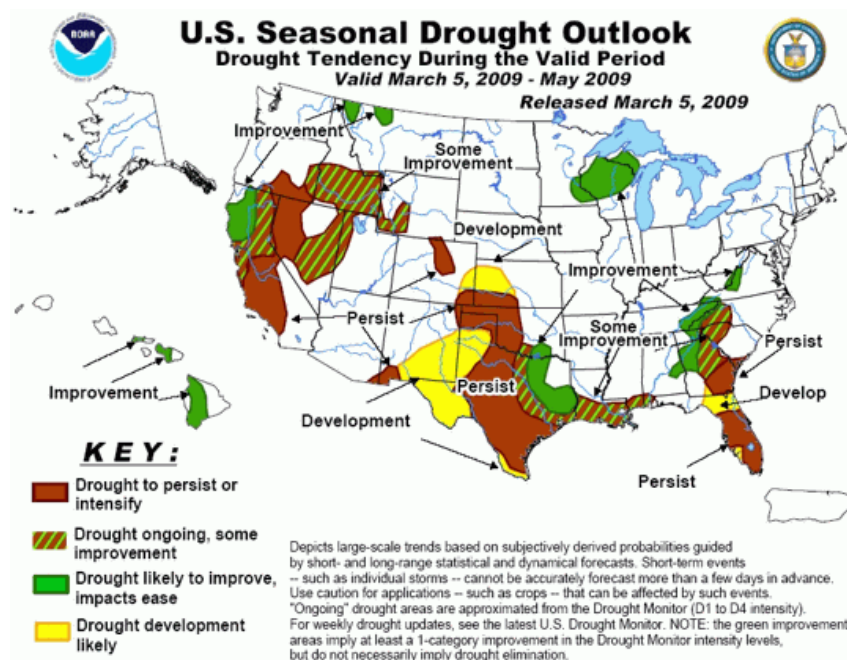
The National Weather Service provides a full range of fire weather products and services for Kansas. Included are the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. Each NWS office serving Kansas has these products available on its website. These websites may be accessed from this [county warning and forecast area](#) map. Clicking on one of these areas takes you to that NWS Office's home page. Look for "Fire Weather" in the menu on the left margin of the page.

[Fire weather](#) links are also available from the Weather Data Library at Kansas State University, as are prescribed burning guidance publications.

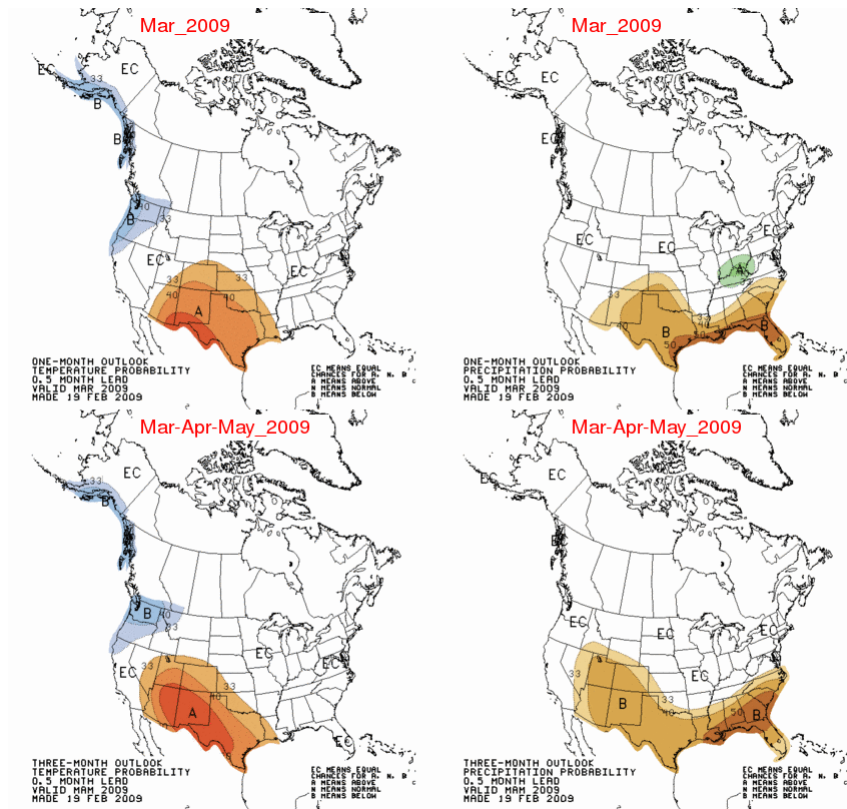
LOOKING AHEAD

The [Seasonal Drought Outlook](#), developed by the NOAA Climate Prediction Center (NOAA CPC), assesses the likelihood for improvement, persistence or deterioration in drought conditions for areas currently experiencing drought as identified by the U.S. Drought Monitor. The Outlook released March 5th for the period through May 2009 (see below) shows the likelihood for present drought conditions in southwest Kansas to persist or intensify. Drought development is also considered likely to the north of this area. The Drought Outlook is updated on the first and third Thursday of each month.

Two additional NOAA CPC products, the [One Month Outlook](#) and the [Three Month Outlook](#), assess the chances for above normal, normal or below normal precipitation and temperatures for the upcoming month and for the upcoming three-month period. Maps depicting these Outlooks are shown below. The most recent Outlook indicates the likelihood for above normal temperatures and below normal precipitation across most of Kansas during March. Above normal temperatures and below normal precipitation are likely across western Kansas during the overall March – May period.



March 2009 and March – May 2009 Precipitation and Temperature Outlooks



ADDITIONAL INFORMATION

The Kansas Climate Summary and Drought Report is compiled by the Kansas Water Office from various federal, state, local and academic sources. The report summarizes conditions at the end of the month indicated. Some data used is preliminary and is subject to change when final data is available at a later date.

The Kansas Water Office web site, [KWO Drought](http://www.kwo.ks.gov), contains additional drought information including links to other agencies with drought information and past issues of the Kansas Climate Summary and Drought Report. The Operations Plan for the Governor's Drought Response Team is also available here.

Please contact Tom Lowe at the KWO (785/296-0874) or tom.lowe@kwo.ks.gov, should you have any questions or suggestions.

**Appendix A
February 2009
Kansas Climate Summary**

Station (West)	Precipitation (inches)			Temperature (°F)			
	Total	Departure ³	Percent Normal	Mean	Departure ³	Extreme (Date)	
						Highest	Lowest
Colby ²	0.38	-0.08	83	36.8	6.1	75 (6)	8 (28)
Dodge City ¹	0.18	-0.48	27	40.7	4.7	82 (6)	10 (14, 15)
Garden City ¹	0.11	-0.42	21	41.1	6.0	81 (6)	11 (15)
Garden City ²	0.08	-0.40	17	38.7	4.7	77 (6)	8 (15)
Goodland ¹	0.63	0.19	143	36.4	4.0	73 (6)	6 (15)
Hill City ¹	0.12	-0.63	16	37.1	5.1	79 (6)	4 (28)
Tribune ²	0.46	-0.06	88	37.7	4.9	72 (6)	9 (15, 28)
(Central)							
Concordia ¹	0.31	-0.42	42	36.5	4.1	72 (6, 17)	5 (28)
Hays ²	0.03	-0.62	5	37.8	5.2	80 (6)	4 (28)
Hesston ²	0.45	-0.50	47	40.1	4.6	72 (7, 17, 25)	8 (28)
Hutchinson ²	0.20	-0.88	19	39.9	5.4	76 (17)	8 (28)
Medicine Lodge ¹	0.43	-0.54	44	42.5	6.4	77 (17)	13 (28)
Russell ¹	0.12	-0.66	15	39.1	5.6	79 (6)	9 (15)
Salina ¹	0.26	-0.80	25	38.9	4.0	75 (6, 17)	6 (28)
Scandia ²	0.11	-0.50	18	34.3	2.6	68 (6, 17)	4 (28)
Smith Center ¹	---	---	---	36.7	---	71 (24)	4 (28)
St. John ²	0.10	-0.75	12	39.7	2.8	75 (6)	6 (28)
Wichita (ICT) ¹	0.60	-0.42	59	42.4	6.1	76 (25)	11 (28)
(East)							
Chanute ¹	1.49	-0.41	78	41.8	5.2	75 (26)	10 (4)
Johnson Co. Exc. Apt. ¹	1.59	0.32	125	38.1	3.0	70 (7)	8 (4)
Manhattan ²	0.62	-0.38	62	36.7	2.5	72 (6, 10)	6 (4)
Ottawa ²	1.01	-0.27	79	39.7	3.5	73 (7)	6 (4)
Parsons ²	1.25	-0.53	70	42.2	5.8	74 (26)	12 (4)
Powhattan ²	0.47	-0.66	42	35.4	5.3	71 (10)	6 (4)
Rossville ²	0.28	-0.70	29	36.9	---	72 (10)	5 (4)
Silver Lake ²	0.15	-1.03	13	38.0	4.6	73 (10)	4 (4)
Topeka (TOP) ¹	0.45	-0.73	38	38.6	5.2	72 (10, 25)	7 (4)
(Neighbouring States)							
Burlington, CO ¹	0.36	-0.05	88	36.1	4.0	71 (6)	6 (15)
Lamar, CO ¹	0.51	---	---	38.9	---	74 (24)	9 (2)
Springfield, CO ¹	0.42	---	---	40.3	---	73 (6)	11 (15)
Falls City, NE ¹	0.46	-0.49	48	33.7	3.5	68 (6)	2 (4)
Hebron, NE ¹	0.09	-0.63	13	34.0	5.5	67 (6)	3 (14, 28)
McCook, NE ¹	0.23	-0.41	36	34.2	2.4	75 (6)	4 (28)
Bartlesville, OK ¹	2.20	0.27	114	44.0	2.9	78 (26)	9 (4)
Guymon, OK ¹	0.33	-0.03	92	43.3	5.1	80 (6)	14 (2)
Ponca City, OK ¹	1.05	---	---	45.0	5.3	76 (7)	11 (4)
Joplin, MO ¹	2.38	0.13	106	42.9	4.0	74 (26)	11 (4)
Kansas City (MCI), MO ¹	0.81	-0.50	62	36.8	3.8	69 (7)	6 (4)
St. Joseph, MO ¹	0.56	-0.57	50	34.4	2.1	68 (7, 25)	0 (4)
1. Airport Automated Observation Stations (NWS/FAA) 2. Kansas State University Experiment Station Network 3. Departure from 1971-2000 normal value T – trace; M – missing data; - - - no normal value from which to calculate departure or percent of normal Source: : National Weather Service Daily and Monthly Climate Summaries and KSU Weather Data Library							