

KANSAS CLIMATE SUMMARY AND DROUGHT REPORT

Current Conditions, Drought Impacts and Outlook

January 2010

Kansas continues in the deep freeze

January was colder than normal across much of Kansas. This continues the pattern seen in December. January statewide average temperature of 26.1 ranks as the 33rd coldest in the state's 115 year (1895-2009) climate record. This was warmer than December, but still 1.7 °F below normal.

Statewide average precipitation was 0.43 inches, which was 67% of normal. In contrast to December, the southern tier of divisions saw the highest precipitation amounts. The southwest division averaged 0.41 inches, which was 110% of normal. This was the only division that averaged above normal precipitation for the month. The colder than normal temperatures and the persistent snow cover from December minimized any negative impacts from the precipitation shortfall. Preliminary data indicates the greatest monthly precipitation from a NWS COOP site was 2.96 inches at Cassoday. The greatest monthly snowfall was 19.5 inches at Girard.

The U.S. Drought Monitor does not presently show drought or abnormally dry conditions anywhere in the state, and the latest Drought Outlook does not indicate any developing drought conditions.

CURRENT COUNTY DECLARATIONS

No county drought stage declarations issued by the Governor are presently in effect.

Presidential major disaster declarations affecting Kansas in 2009 are:

- FEMA-1868-DR (Severe winter storm; November 14-16, 2009)
- FEMA-1864-DR (Severe winter storm; November 16-17, 2009)
- FEMA-1860-DR (Severe storms and flooding; July 8-14, 2009)
- FEMA-1853-DR (Severe storms, tornadoes and flooding; June 5 - 26, 2009)
- FEMA-1848-DR (Severe winter storm; March 26 -29, 2009)
- FEMA-1849-DR (Severe storms, flooding, high winds and tornadoes; April 25 to May 16, 2009)
- FEMA-1847-DR (Severe storms, tornadoes and flooding; May 8 and May 16, 2009)

Up-to-date information regarding designated counties and assistance available due to these declarations is available here: <http://www.fema.gov/dhsusda/index.jsp>. Assistance is available for varying periods of time after the disaster designation is affirmed.

U.S. Secretary of Agriculture Tom Vilsack has made the following Primary Natural Disaster Area designations in Kansas:

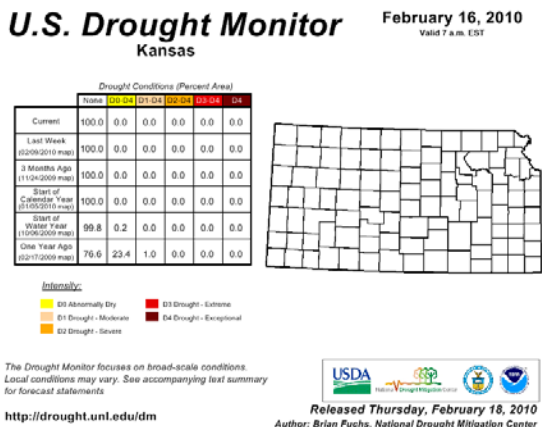
- November 6, 2009 (3 counties) for losses caused by high winds and hail from July 17 – September 3, 2009.
- August 29, 2009 (20 counties) for losses caused by heavy rain, flash flooding, high winds and hail from April 27 – July 8, 2009
- July 22, 2009 (8 counties) for losses due to excessive rain, flash flooding, flooding, high winds and freeze from March 27 – May 31, 2009

A state receives primary disaster declaration when the principal disaster occurs within the state. Counties within Kansas and counties in bordering states that are adjacent to them are identified as “contiguous.” They also are eligible for disaster relief. For additional information regarding these USDA designations, please see: <http://www.rurdev.usda.gov/rd/disasters/>.

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. It is important to note that the Monitor is intended to provide a “big picture” perspective of conditions across the nation. It is not designed to show local conditions or to replace state and local-level monitoring efforts.

As was the case for the last several months, the February 16 Monitor does not indicate the presence of drought or abnormally dry conditions anywhere in Kansas. The table accompanying the map compares the percentage of the state currently affected by drought conditions with several points during the past year.



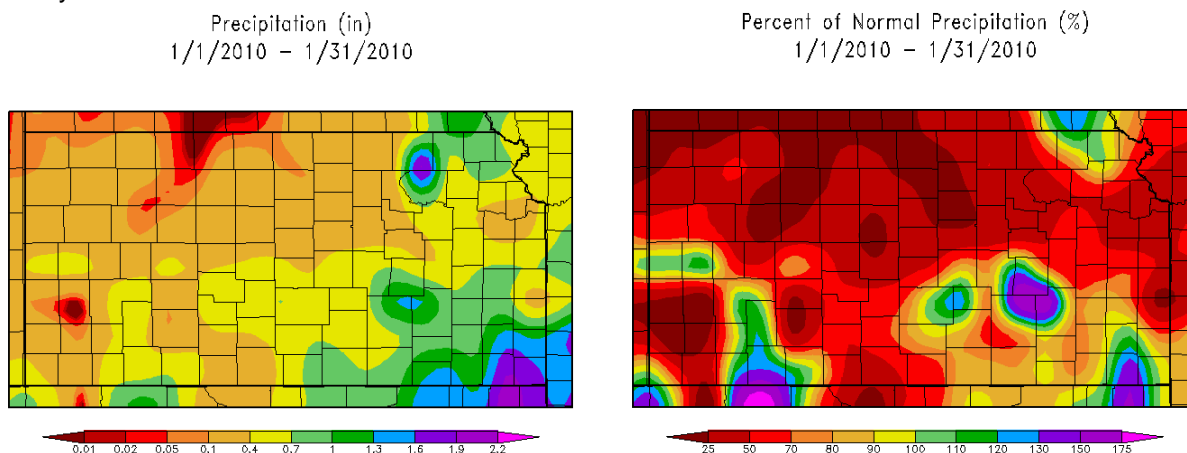
In the Kansas county drought stage scheme, a Drought Watch equates roughly to moderate drought in the U.S. Drought Monitor, while a Drought Warning is the equivalent of severe drought. A Drought Emergency is reserved for extreme or exceptional drought.

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 January 30th was 3.35 (very moist). Divisional PDSI values ranged from 2.47 (unusually moist) in the west central to extremely moist values of 4.89 in the northwest.

January Conditions

January ranks as the 68th wettest on record (1895-2009) in Kansas with a statewide average total precipitation of 0.43 inches. This is 67 percent of normal. Based on preliminary reports, the greatest total precipitation received in January at National Weather Service COOP network stations, was 2.96 inches at Cassoday (Butler County). Tops for the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS) during January was 1.98 inches at Cherokee in Crawford County. On the low end, multiple locations in Kansas received no precipitation during January, the least reported by the state’s NWS COOP observers. The driest among CoCoRaHS observers was zero, also reported at multiple locations..

The maps below show total precipitation received and the percent of normal across the state in January:



The following maps show average monthly temperature and the departure from normal across Kansas during January. The statewide average temperature of 26.1° F was 1.7 degrees below normal. This was the 33rd coldest January of record (1895-2009) for Kansas. January 1941 was the coldest with a statewide average temperature of 13.9° F. Average monthly temperatures at individual reporting locations ranged from 19.4° F at Horton, to 33.5° F at Elkhart (Morton County). The highest temperature recorded in Kansas during January was 68° F on the 14th at Ashland (Clark County). The coolest reading observed in the state during January was -14° F at Belleville (Washington County) on the 10th.

A map showing snow cover is included in Appendix B.

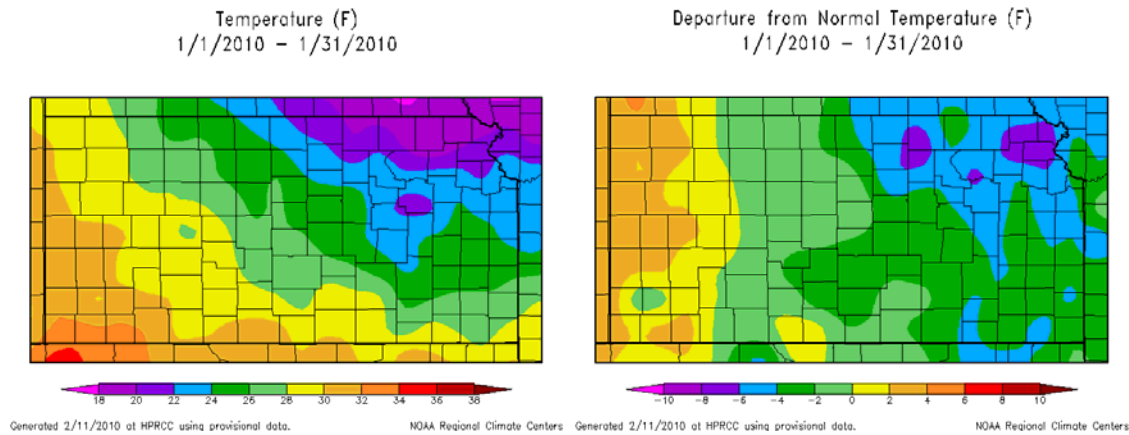
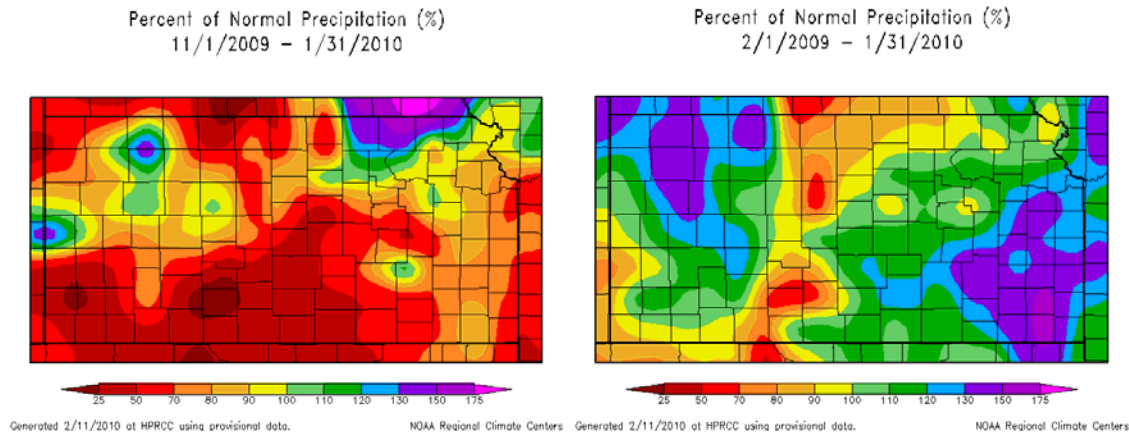


Table 1 summarizes January temperature and precipitation conditions by climate division while Appendix A provides a January summary for principal reporting locations within and adjacent to Kansas. Please note that the data used in compiling Table 1 and Appendix A is preliminary and comes from different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

Division	Precipitation (inches)			Temperature (°F)			
	January 2010			Monthly Extreme			
	Total	Dep. ¹	% Norm	Average	Dep. ¹	Highest	Lowest
Northwest	0.06	-0.33	15	27.9	0.7	63	-11
West				29.3			
Central	0.27	-0.14	66		1.3	65	-11
Southwest	0.41	0.03	110	30.6	0.6	68	-9
North				23.0			
Central	0.12	-0.41	21		-2.3	56	-14
Central	0.32	-0.30	52	25.3	-2.3	60	-14
South				27.9			
Central	0.54	-0.12	82		-1.8	68	-8
Northeast	0.40	-0.46	45	21.0	-4.4	57	-11
East				23.4			
Central	0.45	-0.58	47		-3.9	57	-13
Southeast	1.12	-0.05	96	26.5	-3.4	61	-13
State	0.43	-0.34	63	26.1	-1.7	68	-14

1. Departure from 1971-2000 normal value
2. State highest temperature of 68° F reported from Ashland, Liberal, and Wilmore on Jan. 31, 2010
3. State lowest temperature of -14° F reported from Hill City, Washington on the 9th; Belleville on the 10th
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 (November 2009 – January 2010) and during the 12 months (February 2009 – January 2010)



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 county [precipitation data](#) is available from the Weather Data Library at Kansas State University.

DROUGHT IMPACTS AND RESPONSE

Agriculture

The [Kansas Crop Progress and Condition Report](#) is updated weekly during the growing season; monthly during the winter. Depending on the time of the year, information includes crop conditions and progress, soil moisture conditions, range and pasture conditions, hay and pasture supplies and stock water supplies.

The Report released February 1, 2010 rated topsoil moisture statewide as 9 percent short-very short compared with 4 percent short-very short one month ago and 49 percent short-very short at this time last year. The eastern third of the state had the wettest soil conditions. Southeast Kansas' soil moisture was 58 percent surplus.

Statewide, hay and forage supplies were rated 86 percent adequate and 6 percent surplus. Snow cover and cold temperatures have made it necessary to feed more, drawing down feed supplies

Statewide wheat conditions for the week ended Feb. 1, 2010 were – 56 percent good-excellent, 33 percent fair, and 11 percent poor to very poor.

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.

As of Jan. 27, 2010, no streams were under minimum desirable stream (MDS) flow administration by the Kansas Department of Agriculture-Division of Water Resources. Nine of the 33 gaging stations where MDS targets have been established, including Clay Center and Concordia, have been ice affected for most of the month. Spot measurements taken by USGS at the Clay Center gage during a brief ice-free period (Jan. 26-Jan. 29) showed flow measurements of 1,230 cfs on Jan. 27. While the quality of the measurements at both Clay Center and Concordia gages was not considered very good, flows were in

excess of the January minimum desirable stream flow levels (100 cfs at Concordia and 125 cfs at Clay Center). MDS levels increase by 25 cfs at both locations for February.

Table 2 summarizes federal reservoir pool elevations on December 31, 2009 in terms of departure from the top of the conservation/multipurpose pool and pool elevation change since November 30th.

Table 2 Kansas Federal Reservoirs End-of-Month Pool Elevation Summary					
Reservoir	Top MP/C Pool ¹	Pool Elevation (Feet MSL)		1/31/2010	
		12/31/09	1/31/2010	Departure from Top ²	Change from 12/31/2009 ²
Kansas River Basin					
Norton ³	2304.3	2294.6	2294.9	-9.4	0.3
Harlan County, NE	1946.0	1946.1	1946.4	0.4	0.3
Lovewell ³	1582.6	1579.3	1579.6	-3.0	0.3
Milford ³	1144.4	1144.2	1142.7	-1.7	-1.5
Cedar Bluff	2144.0	2127.5	2127.7	-16.3	0.2
Kanopolis ³	1463.0	1462.2	1462.2	-0.8	0.0
Wilson ³	1516.0	1516.5	1516.2	0.2	-0.3
Kirwin ³	1729.3	1729.4	1729.4	0.1	-0.0
Webster ³	1892.5	1893.1	1892.6	0.1	-0.5
Waconda ³	1455.6	1455.2	1454.4	-1.2	-0.8
Tuttle Creek ³	1075.0	1072.2	1073.3	-1.7	1.1
Perry ³	891.5	892.9	892.7	1.2	-0.2
Clinton ³	875.5	875.9	876.4	0.9	0.5
Pomona ³	974.0	972.0	973.9	-0.1	1.9
Melvern ³	1036.0	1034.7	1035.6	-0.4	0.9
Hillsdale ³	917.0	918.0	918.0	1.0	0.0
Arkansas River Basin					
Cheney	1421.6	1421.8	1421.9	0.3	0.1
El Dorado	1339.0	1339.0	1339.2	0.2	0.2
Toronto ³	901.5	903.8	899.5	2.0	-4.3
Fall River ³	948.5	951.2	946.5	-2.0	-4.7
Elk City ³	796.0	796.9	795.0	-1.0	-1.9
Big Hill	858.0	858.3	858.4	0.4	0.1
Council Grove ³	1274.0	1274.2	1274.7	0.7	0.5
Marion ³	1350.5	1349.7	1349.8	-0.7	0.1
John Redmond ³	1039.0	1039.6	1039.1	0.1	-0.5
<ol style="list-style-type: none"> 1. Elevations listed are the multi-purpose/conservation pool level. All figures are in comparison to this level, not the seasonal pool operation levels that are in effect at numerous reservoirs. El Dorado has a seasonal pool level. 2. All values are in feet. Negative departures or changes are shown in red. Source: U.S. Army Corps of Engineers 3. Lake level management plan in place 					

To better manage a reservoir for multiple purposes, lake level management plans have been developed. The water levels of these lakes fluctuate during a year according to the management plan. [Lake level management plans](#) are posted on the Kansas Water Office web site www.kwo.org

Public Water Systems

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

Several publications provide guidance regarding drought preparedness and response. The [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.

The 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. Production of this map will resume in March 2010.

The Vegetation Drought Response Index ([VegDRI](#)) provides another perspective on vegetation conditions across the state. VegDRI attempts to isolate the impact of drought or other moisture conditions from other factors that influence vegetation condition.

The VegDRI map is updated on a bi-weekly basis; it is currently out-of-season for Kansas.

Wildfire

No large wildfires were reported to the Kansas Forest Service in January. Wildfires burning at least 300 acres in grass/brush or 100 acres in timber are considered large.

The [Wildland Fire Outlook](#) issued by the National Interagency Fire Center on February 1 foresees near normal significant wildfire potential across Kansas during the March-May 2010 period. 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.

Some prescribed burns already have occurred this year where the vegetation dried out. Some minor wildfires also have occurred. Overall prediction for this spring is that there may be some limited periods of elevated wildfire activity, as warm, dry, breezy weather allows prescribed burning – and folks rush to get it done in the limited available windows, with or without meeting proper weather and safety parameters. Wildfires, regardless of cause, probably will be limited in scope and duration given high ground moisture levels that will promote early green up.

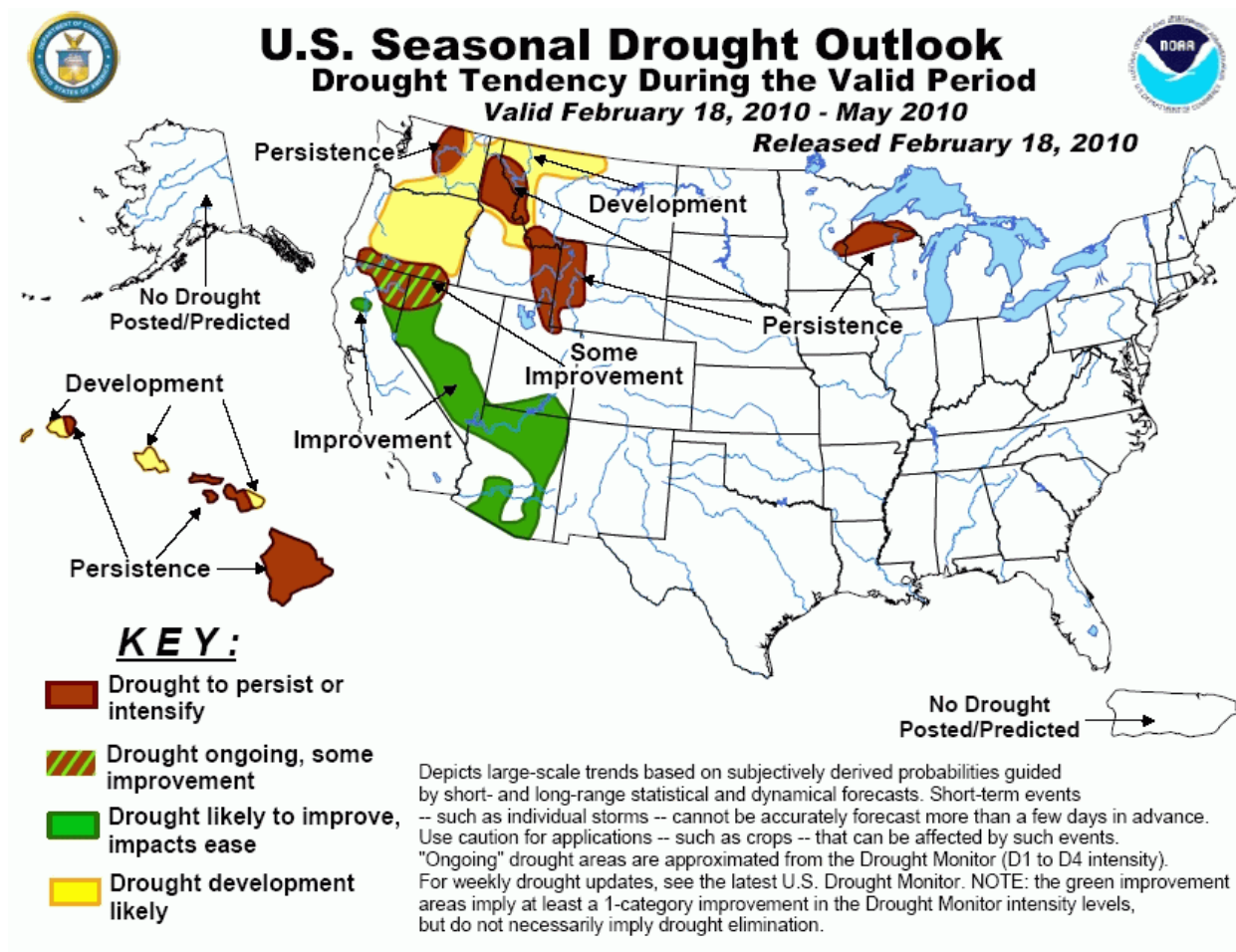
The National Weather Service provides a full range of fire weather products and services for Kansas. Included are the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. Each NWS office serving Kansas has these products available on its website. These websites 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 also are 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 February 18, 2010 for the period through May 2010 (see below) indicated that development of drought conditions in Kansas is unlikely.



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](#), 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.

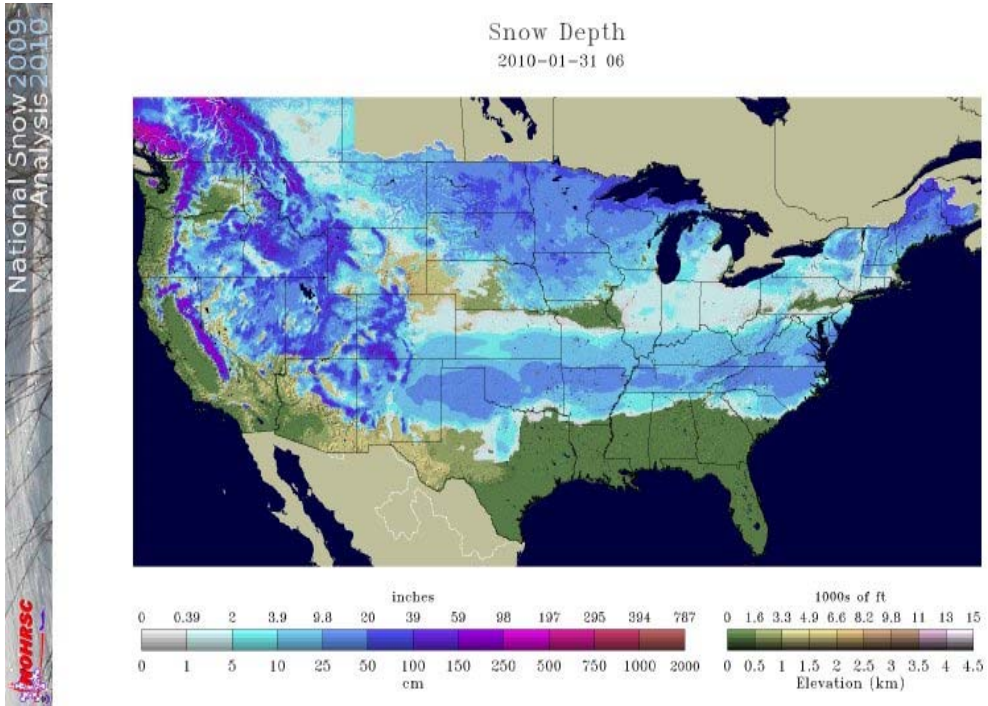
Please contact Hank Ernst at the Kansas Water Office (785/296-1007) or hank.ernst@kwo.ks.gov should you have any questions or suggestions.

**Appendix A
January 2010
Kansas Regional Climate Summary**

Station1	Precipitation (inches)			Temperature of F			
	Total	Departure	Percent Normal	Mean	Departure	Extreme (Date)	
						Highest	Lowest
West							
Burlington, CO	0.06	-0.27	18%	31.1	3.7	61 (12)	-7 (8)
Dodge City	0.61	-0.01	98%	29.9	-0.5	63 (22)	-3 (8)
Garden City	0.14	-0.26	35%	29.4	0.2	63 (22)	-5 (8)
Goodland	0.18	-0.25	42%	29.9	2.3	63 (12)	-6 (8,7)
Guymon, OK	0.57	0.28	197%	33.4	0.2	69 (22)	-3 (8)
Hill City	0.01	-0.55	2%	27.7	0.6	57 (16,13)	-9 (9)
Lamar, CO	0.39	M		29.9	M	66 (13)	-7 (8)
McCook, NE	0.05	-0.45	10%	27.5	1.1	60 (13)	-7 (8)
Springfield, CO	0.27	M		32.7	M	63 (12)	-6 (8)
Central							
Concordia	0.14	-0.52	21%	23	-3.6	50 (22)	-10 (9)
Hebron, NE	M	M		M	M	M	M
Medicine Lodge	0.31	-0.41	43%	30.4	-0.1	67 (22)	1 (9,8)
Ponca City, OK	0.22	M		31.7	-2.1	63 (22)	-1 (9)
Salina	0.12	-0.68	15%	26.1	-2.9	57 (17)	-7 (9)
Wichita (ICT)	0.42	-0.42	50%	28.9	-1.3	59 (22)	0 (9)
East							
Bartlesville, OK	1.48	0.04	103%	30.9	-4.5	62 (19)	-3 (10)
Chanute	0.78	-0.5	61%	27	-3.8	59 (27)	-10 (9)
Fall City, NE	0.95	0.08	109%	19.6	-4.5	50 (23)	-11 (4)
Johnson Co. Exec. Apt	0.27	-0.99	21%	23.9	-5.2	53 (23)	-4 (10)
Joplin, MO	1.4	-0.44	76%	29	-4.1	63 (19)	-2 (10,8)
Kansas City (MCI), MO	0.43	-0.72	37%	23.8	-3.1	54 (23)	-5 (2)
St. Joseph, MO	0.65	-0.23	74%	20.3	-6.1	53 (23)	-17 (4)
Topeka (TOP)	0.45	-0.5	47%	24.5	-2.7	57 (23)	-8 (10)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1971-2000 normal value
T - Trace; M - Missing; --- no normal value from which to calculate departure or percent of normal
Source: National Weather Service F-6 Climate Summaries

Appendix B



Source: National Operational Hydrologic Remote Sensing Center.