KANSAS DROUGHT UPDATE –January 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General – Drought

- Executive Order 14-04 issued by Governor Brownback May 21, 2014, remains in effect. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.
- The US Drought Monitor indicated dry conditions persist across 99.5 percent of Kansas at the end of January. Moderate drought (D1) or worse was affecting 38 percent of the state.
- Both the Monthly Drought Outlook for January 2015 and Seasonal Drought Outlook through March 2015 indicate drought conditions to persist or intensify for western and south central Kansas.
- USDA declared 26 Kansas Counties Primary Disaster areas for 2015 due to drought. An additional 12 contiguous counties are also eligible federal for assistance.

Water Supply

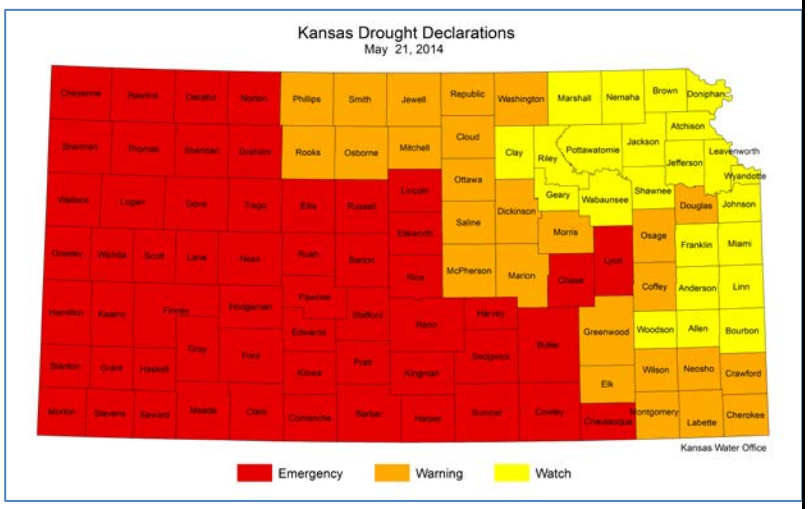
- Some supplies remain in Conservation Plan Stage 3 – Water Emergency: Ellis, McCracken, Medicine Lodge, Russell and Victoria.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration is in effect on the Saline River and the Little Arkansas River.

Kansas County Drought Declarations: Executive Order 14-04 was issued by Governor Brownback May 21, 2014, modifying drought declarations for Kansas counties. Drought stages are in effect for all 105 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use. Crop and pasture conditions also play a role in declaration determination. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.

Drought Emergency:
Barber, Barton, Butler, Chase, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Lane, Lincoln, Logan, Lyon, Meade, Morton, Ness, Norton, Pawnee, Pratt, Rawlins, Reno, Rice, Rush, Russell, Scott, Sedgwick, Seward, Sheridan, Sherman, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wallace, Wichita.

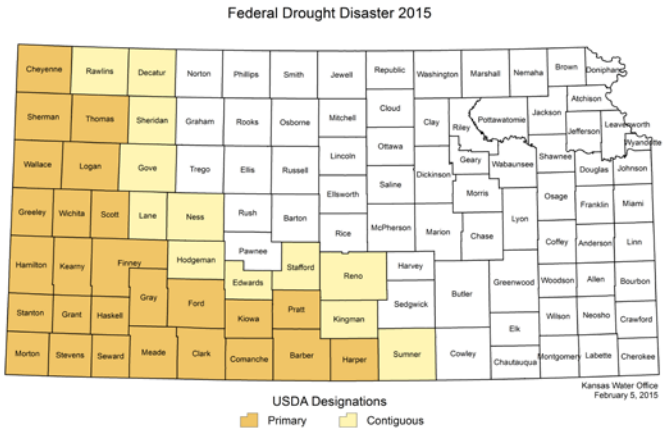


Drought Warning: Cherokee, Cloud, Coffey, Crawford, Dickinson, Douglas, Elk, Greenwood, Jewell, Labette, Marion, McPherson, Mitchell, Montgomery, Morris, Neosho, Osage, Osborne, Ottawa, Phillips, Rooks, Republic, Saline, Smith, Washington, Wilson.

Drought Watch: Allen, Anderson, Atchison, Bourbon, Brown, Clay, Doniphan, Franklin, Geary, Jackson, Jefferson, Johnson, Leavenworth, Linn, Marshall, Miami, Nemaha, Pottawatomie, Riley, Shawnee, Wabaunsee, Woodson, Wyandotte.

Federal: USDA Secretarial Designations of agricultural disaster has not occurred for 2015 as December 9.

USDA has designated 26 Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Cheyenne, Clark, Comanche, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Thomas, Wallace and Wichita.



In addition the contiguous counties are also eligible for natural disaster assistance. These are Decatur, Edwards, Gove, Hodgeman, Kingman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford and Sumner.

Qualified farm operators in the designated areas eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, The Livestock Forage Disaster Program, the Livestock Indemnity Program, the Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

General Conditions

Drought conditions persist across the state, particularly in the west. There was some degradation in the eastern portions of the state. The drought-free portion of the state shrunk to nearly zero. The wet start to February will bring a brief halt to further deterioration. However, a continued dry pattern is likely to result in a rapid expansion of more severe drought conditions. February marks the beginning of our wetter season, and deficits can accumulate rapidly, particularly in the eastern third of the state.

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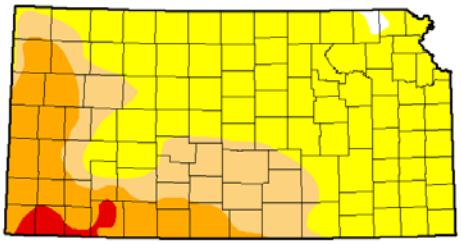

January 27, 2015
(Released Thursday, Jan. 29, 2015)
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.46	99.54	37.66	18.58	1.88	0.00
Last Week 1/20/2015	3.23	96.77	37.66	18.58	1.88	0.00
3 Months Ago 10/28/2014	32.99	67.01	37.50	19.49	2.25	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 1/28/2014	0.13	99.87	63.46	48.63	7.99	0.00

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

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

Author:
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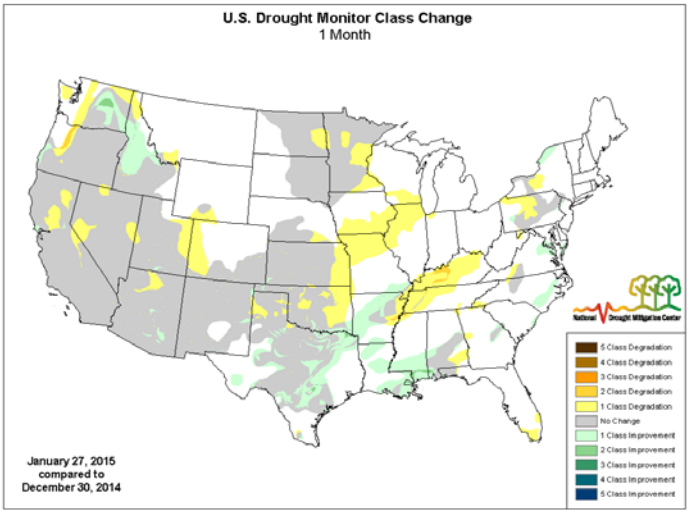
National Drought Mitigation Center

http://droughtmonitor.unl.edu/



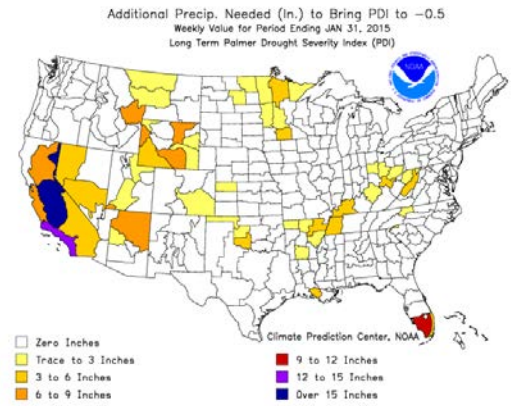
http://droughtmonitor.unl.edu

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

The likelihood of an El Niño/Southern Oscillation (ENSO) continues to diminish. It is still expected to switch to an El Niño event before the end of winter, but it also remains to be seen what impact will be felt. Temperature at least 0.5 °C for 5 consecutive 3 month periods are required for an El Niño to be present. Other global circulation patterns, including the North Atlantic Oscillation (NAO), can have significant impacts on the winter season. El Niño conditions favor milder and wetter than normal conditions in Kansas during the winter but it is not the only global circulation pattern than can produce those conditions. When an El Niño is present there is an increased likelihood of wetter than normal conditions in the Central Plains.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

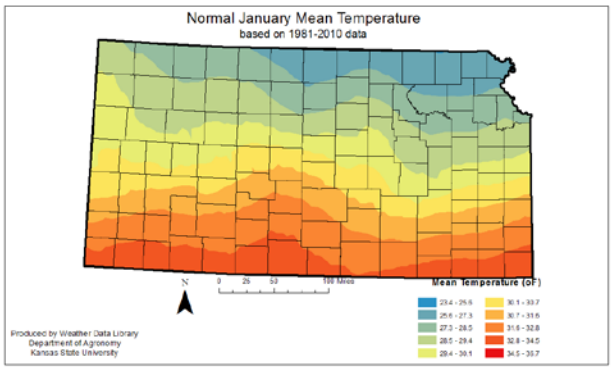
The next map and table provide climate division moisture needs to end drought.



Climate Division	Precipitation needed to End Drought (inches)		
	Week ending January 17	Week ending January 24	Week ending January 31
Northwest	1.78	1.89	1.86
West Central	-	-	-
Southwest	-	-	-
North Central	1.61	1.74	-
Central	-	-	-
South Central	-	-	-
Northeast	-	-	-
East Central	-	-	-
Southeast	-	-	-

Climate Summary (Temperature and Precipitation)

January was framed by extreme weather. The month began with much colder than normal temperatures and snow. The last half of the month was marked with much warmer and drier than normal conditions. The last two days introduced a return to winter with cold, wet conditions. State-wide temperatures averaged 31.2 °F, which was 1.4 degrees warmer than normal. This places it on the warm side of the middle range for January temperatures, as the 40th warmest since 1895. The Southeast Climate Division came closest to average at 32.2 °F or 0.4 degrees warmer than normal. The West Central Climate Division saw the greatest departure. The average temperature for January in that region was 31.8 °F, or 2.1 degrees warmer than normal. The warmer than average temperatures didn't mean that the month was without cold weather. All divisions reached lows that fell below zero. The coldest reading occurred at the beginning of the month, as an Arctic front issued in the New Year. The coldest reading was a -16 °F at Brewster 4W, in Thomas County, on the 1st. Sub-zero readings were recorded even in the Southeastern Division, where temperatures dropped to -3 °F. The warmest reading for the month was 87 °F reported at Great Bend in Barton County, on the

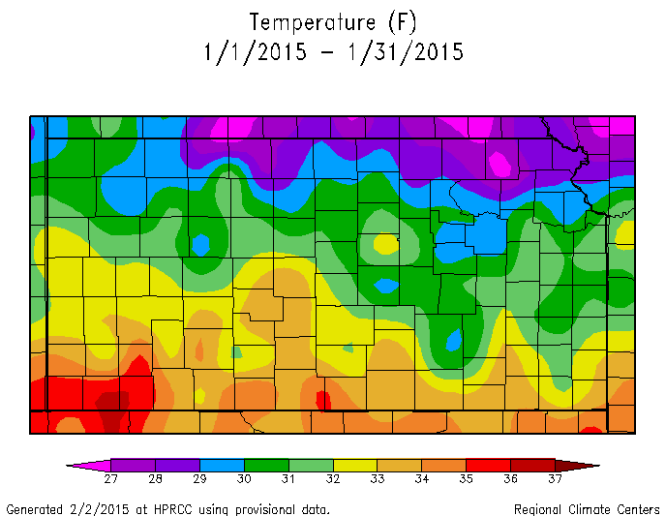


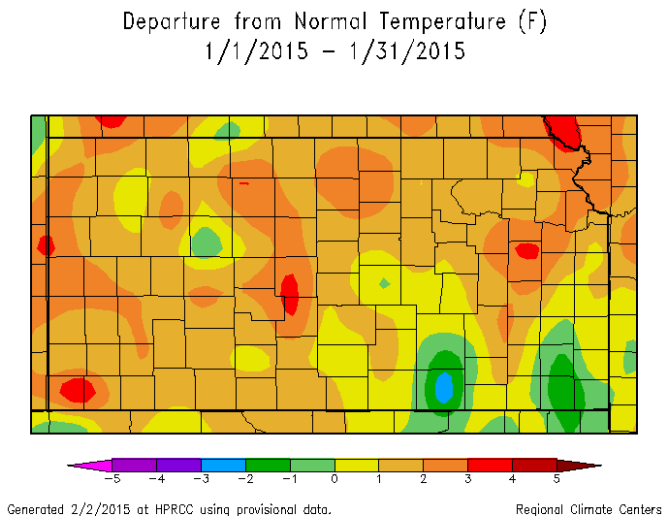
28th. This tied an all-time warmest daily temperature for February in the state. Previous record was set at Hugoton on January 9, 1905. There were 140 record maximum daily temperatures. Of those 13 set records for January. There were 18 record warm minimum temperatures set and 25 records tied. On the cold side of things, 3 record low maximum temperatures were recorded and 1 record was tied. There was only one new record low minimum temperature set. That was the -16 ^{o}F at Brewster 4W on the 1st

The table below summarizes temperatures by climate division and various time periods. Please note the data used in compiling is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

	Kansas Climate Division Temperature Summary (^{o}F)							
	January 1- 31 , 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	43.4	16.6	30.0	1.5	83	28	-16	1
West Central	45.6	18.0	31.8	2.1	83	28	-8	1
Southwest	46.9	20.7	33.8	1.7	82	28	-3	1
North Central	43.3	15.9	29.6	1.7	83	28	-6	1
Central	44.8	17.9	31.3	1.4	86	28	-6	8
South Central	46.4	20.0	33.2	1.1	83	27	-3	9
Northeast	41.7	16.1	28.9	1.4	75	29	-6	8
East Central	42.8	17.7	30.3	1.2	79	29	-8	8
Southeast	44.3	20.0	32.2	0.4	79	29	-3	8
STATE	44.4	18.1	31.2	1.4	86	28th	-16	1st
Data Source: KSU Weather Library								

Temperature summary by the High Plains Regional Climate Center for the month so far is provided in the maps below.



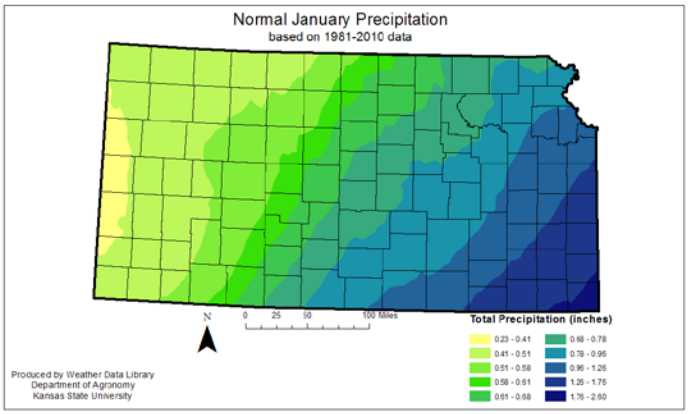


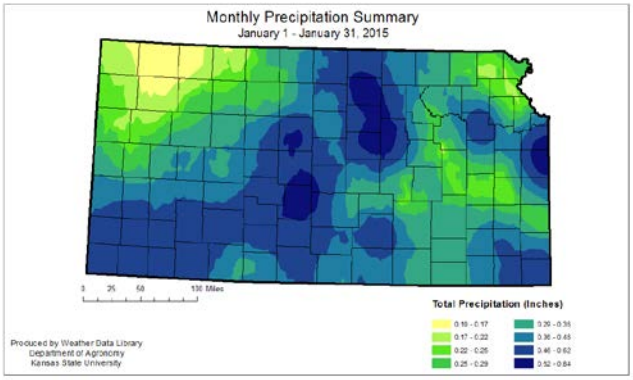
State-wide average precipitation was 0.77 inches which was 99 percent of normal. Fortunately, that deficit equals only 0.02 inches. The Northwest, West Central, South Central and Southeastern climate divisions averaged below normal for the month. The Northwest had the lowest percentage of normal at 36 percent, which translates to a deficit of 0.29 inches for the month. The Southeast Division had the largest deficit at -0.39 inches, which was 72 percent of normal. The areas with greatest departure from normal only had slight increases. The Central Division saw 0.30 inches more than normal, while the North Central Division saw 0.26 inches greater than normal. The remaining divisions saw less than a quarter of inch more than normal. The wettest day of the month was on the 31st, when the average reported precipitation was 0.20 inches. However, the highest daily total reported for the CoCoRaHS network was 1.07 inches at Dodge City 2.7 ENE, Ford County on the 4th. This came as part of a heavy snow event, where the station reported 7 inches. The highest 24 hr total reported for the month at a National Weather Service Coop site was 1.04 inches at Topeka Muni AP, Shawnee County on the 31st and came mainly as rain. Highest monthly total for the National Weather Service was 1.17 inches at Concordia Airport, Cloud County. The greatest monthly total for the CoCoRaHS network was 1.37 inches at Dodge City

2.7 ENE, Ford County The table below summarizes precipitation by climate division and various time periods. Please note the data used in compiling is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

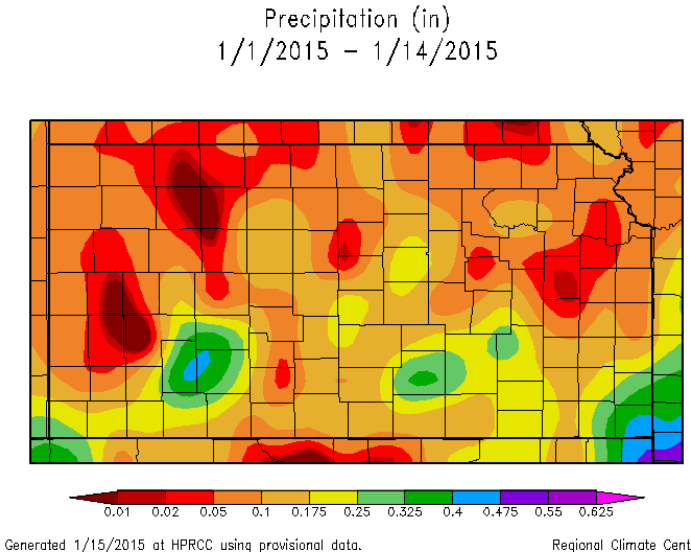
Kansas Climate Division Precipitation Summary (inches) Summary January 16, 2015												
Climate Division	January 1-31			January 1 – January 31			April 1 – January 31			September 1 – January 31		
	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	0.16	-0.29	36	0.16	-0.29	36	16.37	-3.14	83	3.26	-1.66	67
West Central	0.34	-0.16	63	0.34	-0.16	63	19.35	0.58	101	4.32	-0.65	85
Southwest	0.53	0.06	115	0.53	0.06	115	18.46	0.47	101	5.44	0.51	109
North Central	0.89	0.26	138	0.89	0.26	138	22.66	-2.51	89	6.31	-1.04	83
Central	0.99	0.30	144	0.99	0.30	144	25.65	-0.38	99	8.95	1.44	120
South Central	0.74	-0.09	88	0.74	-0.09	88	24.51	-3.02	89	6.42	-2.26	74
Northeast	1.03	0.22	132	1.03	0.22	132	28.61	-2.99	90	10.36	0.22	101
East Central	0.97	0.03	107	0.97	0.03	107	27.88	-6.06	81	11.16	-0.10	96
Southeast	0.86	-0.39	72	0.86	-0.39	72	30.15	-6.60	81	13.48	0.14	99
STATE	0.72	-0.02	99	0.72	-0.02	99	23.67	-2.60	90	7.73	-0.39	93

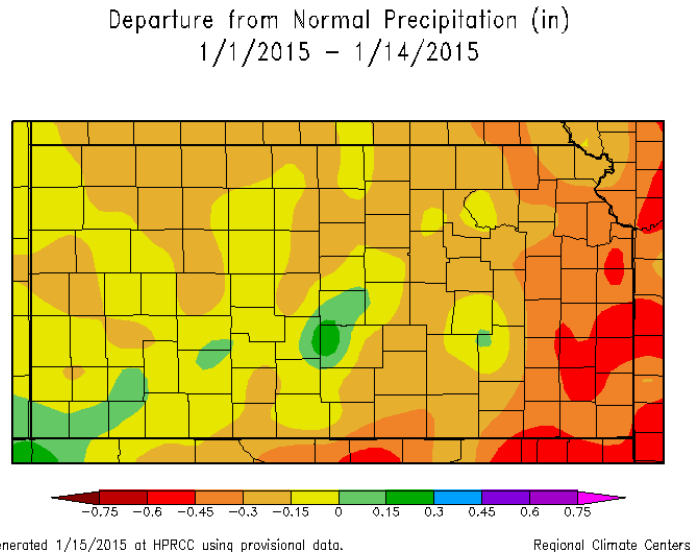
The Kansas Data Library has prepared the normal January precipitation and January 2015 precipitation in the maps below.





Precipitation summary for the month is also provided in the maps below from the High Plains Regional Climate Center.

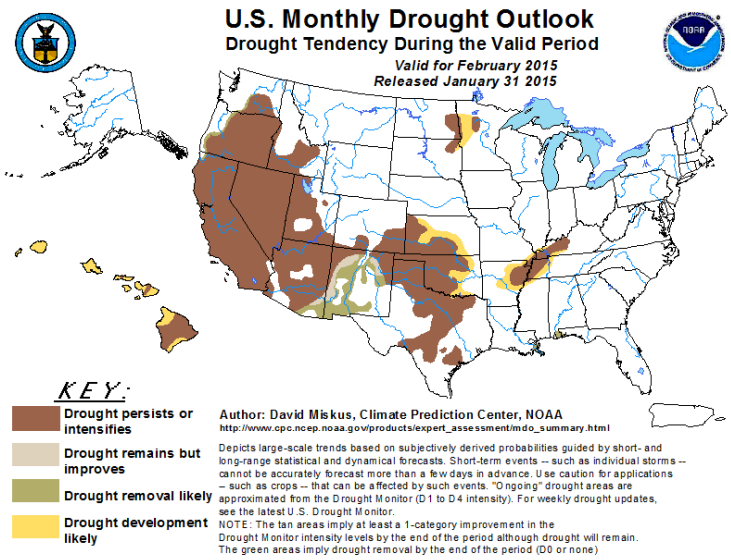


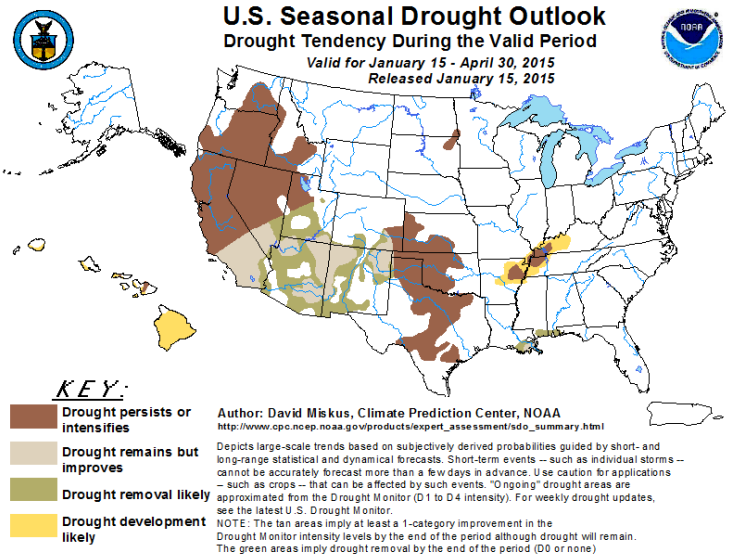


As typical, January was quiet on the severe weather side. There was one snow event, but amounts were generally not troublesome. Highest daily total reported was 5 inches at Elkhart, Morton County on the 5th (NWS) and 7.0 inches at Dodge City 2.7 ENE, Ford County (CoCoRaHS). Unfortunately, the moisture from the snow was limited.

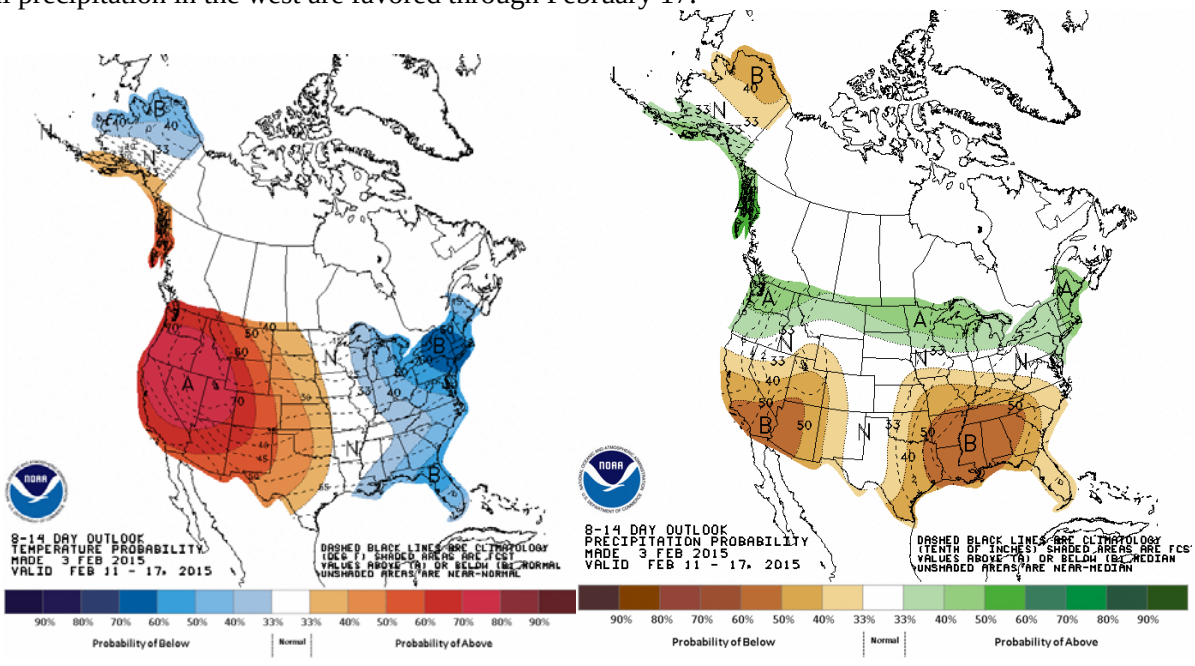
Future Outlook

The February temperature outlook calls for neutral conditions for most of the state, with warmer than normal temperatures for the extreme Northwestern. The precipitation outlook is also neutral, with precipitation equally likely to be above normal, normal or below normal. This does not indicate how that moisture might be distributed, and means snow events or extended dry periods are both possible.

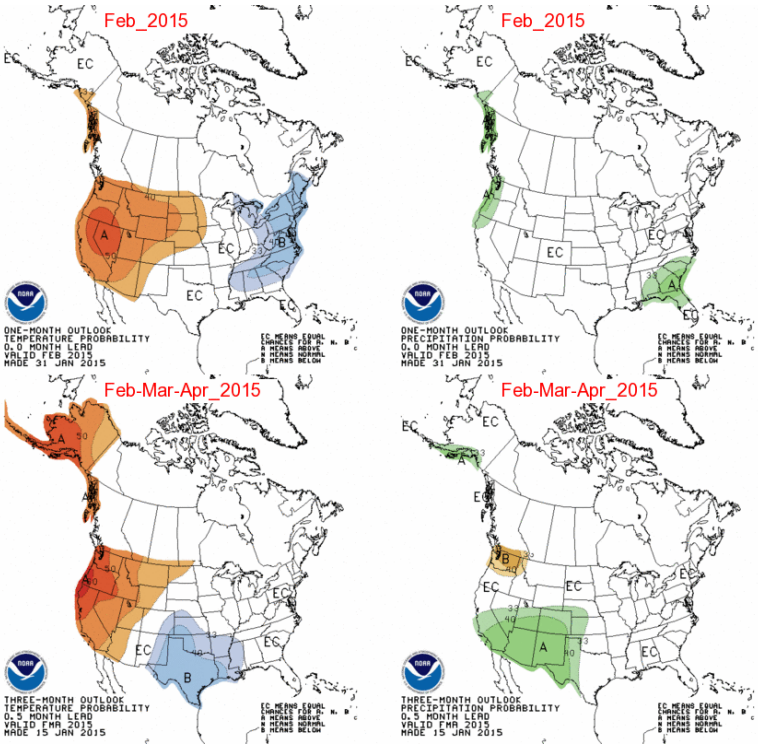




The short term (8-14 day) outlook favors above normal temperatures for Kansas. Below normal precipitation in the east and normal precipitation in the west are favored through February 17.



The three month forecast favors below normal temperatures for most of Kansas, with normal temperatures favored in the north east. Above normal precipitation is favored in the west and normal for the majority of Kansas, for the February thru April period. http://www.hprcc.unl.edu/products/maps/acis/hprcc/ks/MonthPDataHPRCC-KS.png.



Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

The most current list of public water suppliers known or required to be in conservation are included in Appendix A. As there are no reporting requirements for reporting water supply stages this list is based on the best information available.

Surface Water Supply Conditions

Kansas River basin: Releases from Perry, Tuttle Creek, and Milford reservoirs to lower from fall target elevations continued into the first week of January. However, due to low inflows and the need to support target flows on the Kansas River, lake levels were not dropped to the elevations below conservation pool suggested in the seasonal pool plan. Tuttle and Perry were maintained around normal conservation pool and Milford was drawn down about one foot rather than three. Clinton Reservoir received little inflow over the month and experienced a slight decline.

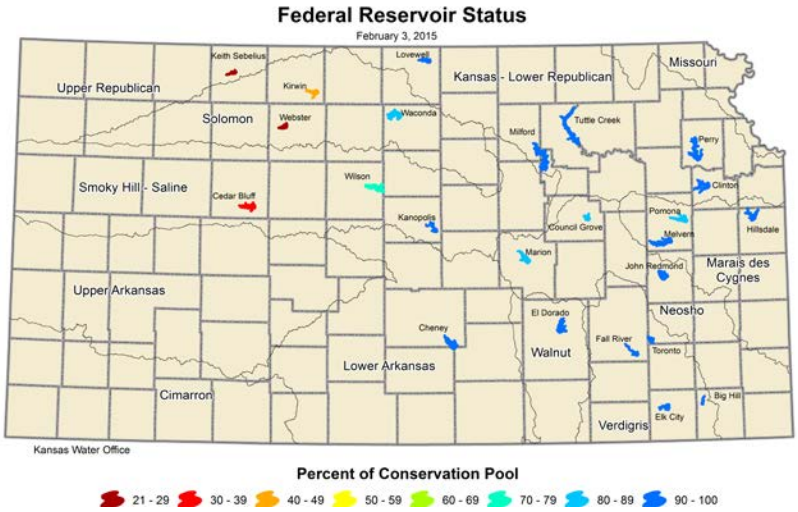
Marais des Cygnes basin: Pomona, Melvern, and Hillsdale reservoirs received very little inflow during the month January. Hillsdale's conservation pool was full and storage at the beginning of the month but was lowered in accordance with the seasonal lake level plan. Pomona and Melvern remained low due to insufficient inflow. Minimum releases were sufficient to meet demands and maintain stream flow of the Marias des Cygnes River.

Cottonwood / Neosho basin: Stream flow in the Cottonwood and lower Neosho rivers were sufficient to meet demands and in-stream needs but Council Grove Reservoir releases were necessary to support demands in the upper Neosho. Storage in Council Grove and Marion reservoirs experienced minimal decline. John Redmond Reservoir storage is in good shape.

Verdigris basin: All reservoirs received inflow and remained at or above normal pool level. Supplemental releases were not necessary to meet target flows.

Smoky Hill basin: The Smoky Hill basin remains dry and Kanopolis Reservoir has very little inflow but pool remained above conservation elevation and discharged through the uncontrolled notch through the month. Downstream flow was sufficient and above the low flow target at Mentor.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

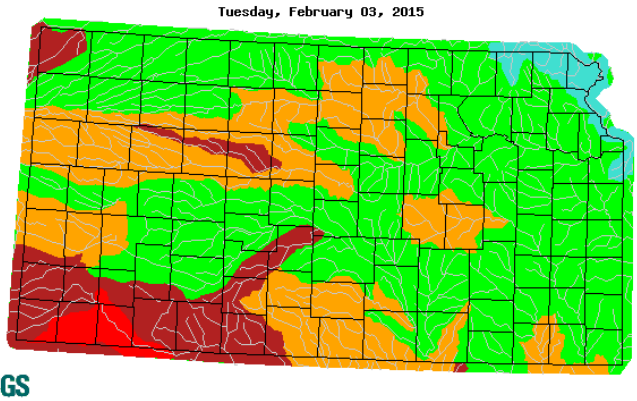
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**02/03/2015 06:00 AM**		
Norton[1]	2304.3	2288.18	-16.12	28.5
Harlan County, NE	1945.73	1931.72	-14.01	50.0
Lovewell[1]	1582.6	1581.36	-1.24	89.9
Milford[1]	1144.4	1143.16	-1.24	95.0
Cedar Bluff	2144	2121.03	-22.97	35.5
Kanopolis[1]	1463	1464.29	1.29	100.0
Wilson[1]	1516	1507.85	-8.15	72.3
Webster[1]	1892.5	1870.97	-21.48	24.8
Kirwin[1]	1729.3	1715.38	-13.87	42.9
Waconda[1]	1455.6	1453.42	-2.18	88.0
Tuttle Creek[1]	1075	1075.65	0.65	100.0
Perry[1]	891.5	891.70	0.20	100.0
Clinton[1]	875.5	874.53	-0.97	94.2
Melvern[1]	1036	1034.15	-1.85	91.8
Pomona[1]	974	972.17	-1.83	87.4
Hillsdale[1]	917	915.81	-1.19	92.8
Arkansas River Basin		**02/03/2015 08:00 AM**		
Cheney	1421.6	1420.15	-1.45	92.0
El Dorado	1339	1336.71	-2.29	90.0
Toronto[1]	901.5	902.43	0.93	100.0
Fall River[1]	948.5	948.95	0.45	100.0
Elk City[1]	796	796.44	0.44	100.0
Big Hill	858	857.80	-0.20	100.0
Council Grove[1]	1274	1271.22	-2.78	83.0
Marion[1]	1350.5	1348.91	-1.59	88.0
John Redmond[1]	1039	1041.34	0.34	100.0

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

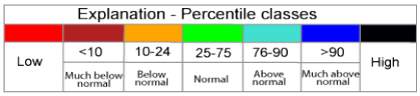
Streamflow Conditions

The comparison of below normal streamflow for historical is shown on the map below left.



USGS

In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



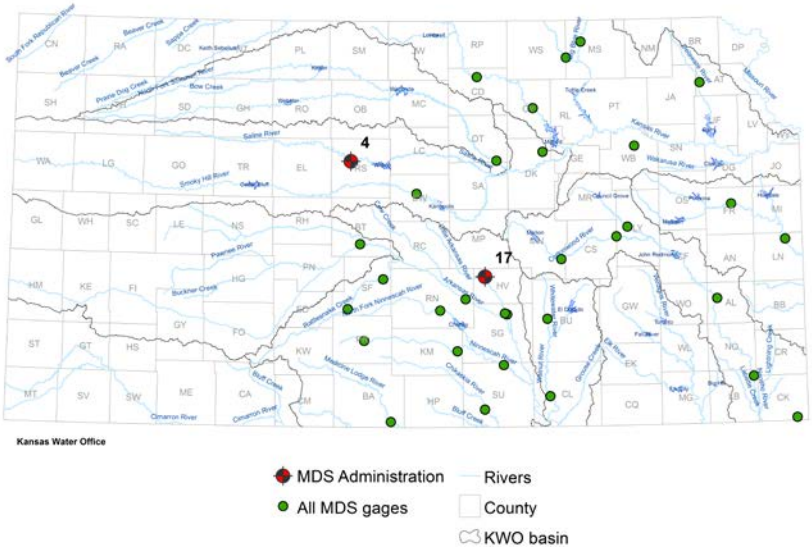
Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is not being administered anywhere in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days

A total of 17 water right files are under administration on the streams as indicated in the table below.

Streamflows in cubic feet per second (cfs)							
Gaging Station	**Flow January 1**	**Flow January 8**	**Flow January 15**	**January MDS**	**Administration Date**	**Number of Rights Admin.**	**Map Location**
Republican River at Concordia	ice	ice	ice	100	Ceased 9/17/2014		
Republican River at Clay Center	ice	ice	ice	125	Ceased 6/20/2014		
Smoky Hill River at Ellsworth	ice	ice	ice	20			
Saline River near Russell	2	2	3	5	10/22/2014	8	4
Chapman Creek near Chapman	10	ice	ice	10	Ceased 10/29/2014		
Mill Creek near Paxico	12	ice	ice	8			
Little Arkansas at Alta Mills	**8**	**7**	**7**	**8**	**01/16/2015**	**9**	**17**
Whitewater River near Towanda	8	8	7	10			
Medicine Lodge River near Kiowa	ice	ice	ice	50	Ceased 12/23/2014		

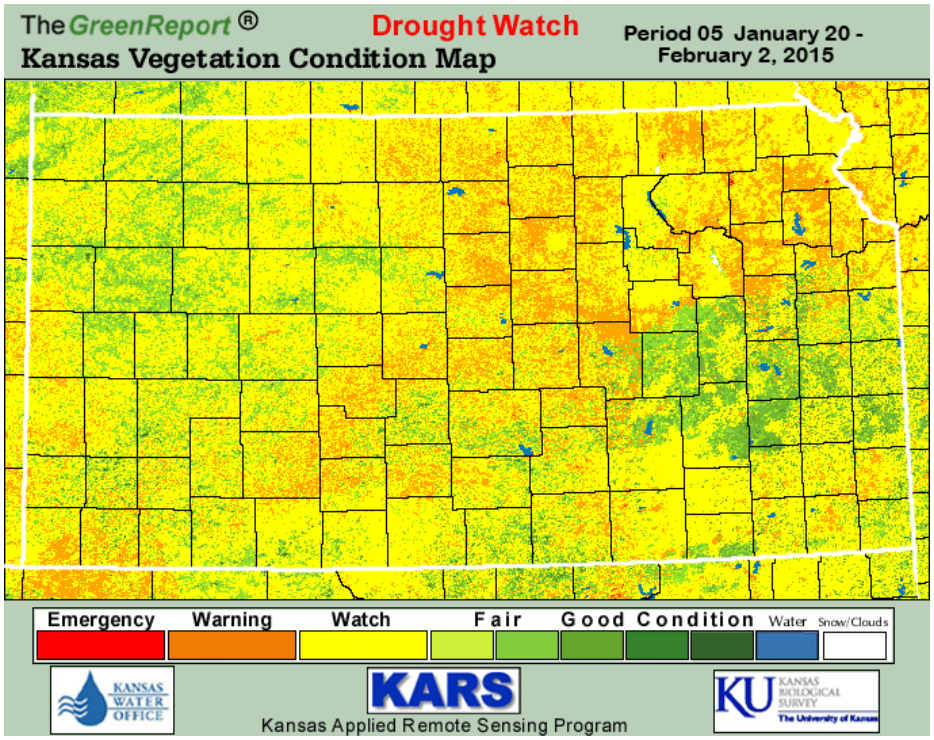
Kansas Minimum Desirable Streamflow (MDS) Gages Administration
January 31, 2014

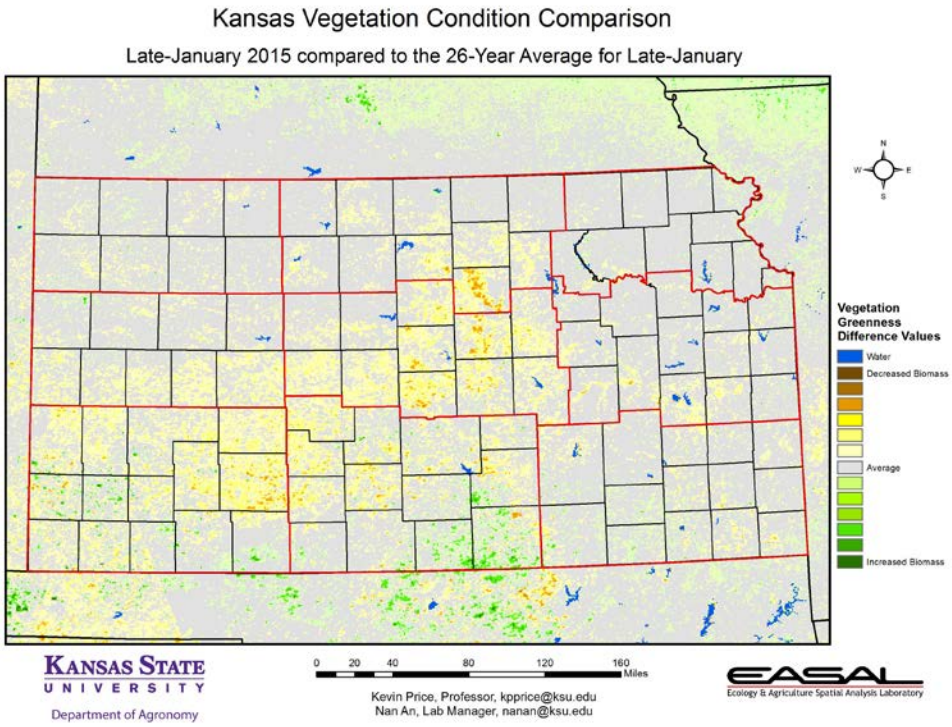


Soil, Crop and Vegetation

Kansas Vegetative Conditions

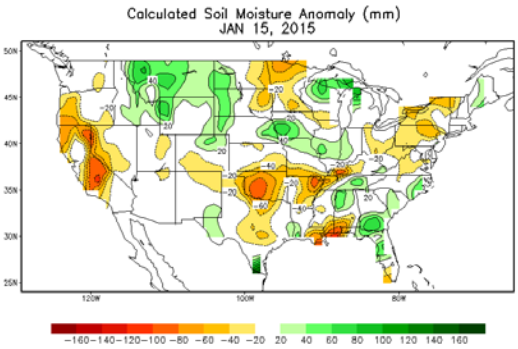
The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. All looks normal for this time of year. Not much "Greenness" to measure, however wheat in the south-central and western areas of Kansas appear to be in good shape. The K-State Vegetative Condition Comparison to historical data is also provided below.





Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology.
http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml



Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

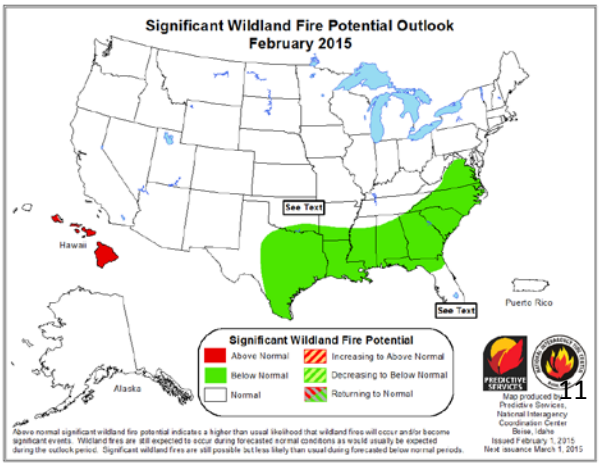
USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. During the winter months this report is monthly rather than weekly. The next report will be released December 30, 2014. For the week ending November 30, 2014 USDA news release reported topsoil moisture rated 13 percent very short, 33 percent short, 54 percent adequate, and 0 percent surplus. Subsoil moisture rated 16 percent very short, 32 percent short, 52 percent adequate, and 0 percent surplus.

Pasture and range conditions rated 8 percent very poor, 16 poor, 43 fair, 31 good, and 2 excellent. Stock water supplies rated 8 percent very short, 21 short, 71 adequate, and 0 surplus.
http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.
Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.



Burn Bans and Fires

The Predictive Services section at the National Interagency Fire Center's Wildland Fire provides monthly fire hazard

predictions. http://www.predictiveservices.nifc.gov/outlooks/outlooks.htm

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's Natural Resources Conservation Service (NRCS) administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals

reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A
Known Conservation Stages
January 31, 2015

Public Water Supply	County	Conservation Stage	2014 Stage[1]	Comment[2]
Ellis	Ellis	Water Emergency	3	
McCracken	Rush	Water Emergency	3	July 3, 2013/Dec. 22, 2013
Medicine Lodge	Barber	Water Emergency	3	July 1, 2013
Russell	Russell	Water Emergency	3	Stage 4 equivalent to other Stage 3
Victoria	Ellis	Water Emergency	3	March 1, 2014, Warning April 15, 2013
Ellsworth	Ellsworth	Water Warning	2	1/6/14 chg stage 3 to 2
Scott City	Wichita	Water Warning	2	May 2014
Abilene	Dickinson	Water Warning	1	Stage 2- 7/25/13, Stage 3 –level 1, 4/22/13, Stage 2

[1] 1 = Water Watch
2 = Water Warning
3 = Water Emergency

[2] CN Assurance = Cottonwood & Neosho River Water Assurance District
K Assurance = Kansas River Water Assurance District
M Assurance = Marais des Cygnes River Water Assurance District
Marketing = Water Marketing Program

APPENDIX B

December Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	0.28	-0.10	74%	31.5	2.1	74 (27)	-7 (4)
Dodge City	0.66	0.08	114%	33.9	1.7	80 (27)	2 (4)
Garden City	0.38	0.04	112%	32.9	2.0	79 (27)	1 (4)
Goodland	0.28	-0.10	74%	31.9	2.3	79 (27)	-4 (4)
Guymon, OK	1.21	0.81	303%	37.1	1.5	79 (27)	4 (5)
Hill City	0.23	-0.22	51%	31.9	2.6	83 (27)	1 (5,4)
Lamar, CO	0.32	0.02	107%	32.3	3.4	74 (27)	-6 (4)
McCook, NE	0.12	-0.39	24%	31.1	3.9	75 (27)	-5 (4)
Springfield, CO	1.04	0.67	281%	34.4	2.2	74 (27)	0 (4)
Central							
Concordia	1.17	0.59	202%	31.6	3.0	71 (28)	-1 (7)
Hebron, NE				29.2	3.6	69 (28)	-5 (7)
Medicine Lodge	0.76	0.05	107%	35.1	1.7	82 (27)	6 (5)
Ponca City, OK	0.79	-0.21	79%	35.6	0.7	80 (28)	5 (8,7)
Salina	1.20	0.57	190%	32.5	1.5	75 (27)	-5 (7)
Wichita (ICT)	1.11	0.28	134%	34.1	1.9	74 (26)	0 (7)
East							
Bartlesville, OK	0.69	-0.93	43%	35.0	0.0	80 (28)	2 (8)
Chanute	0.63	-0.63	50%	33.9	1.3	75 (28)	2 (8,7)
Fall City, NE	0.96	0.31	148%	29.2	2.7	72 (28)	-5 (7)
Johnson Co. Exec. Apt	0.77	-0.35	69%	32.4	2.3	74 (28)	0 (8,7)
Joplin, MO	0.70	-1.33	34%	35.2	0.3	76 (28)	2 (8)
Kansas City (MCI), MO	1.20	0.13	112%	31.2	2.4	73 (28)	-3 (8,7)
St. Joseph, MO	1.15	0.59	205%	28.5	1.3	73 (28)	-5 (7)
Topeka (TOP	1.12	0.26	130%	31.5	1.8	78 (28)	1 (8,7)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS DROUGHT UPDATE –February 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General – Drought

- Executive Order 14-04 issued by Governor Brownback May 21, 2014, remains in effect. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.
- The US Drought Monitor indicated dry conditions persist across 88.9 percent of Kansas at the end of February. Moderate drought (D1) or worse was affecting 42 percent of the state.
- USDA declared 26 Kansas Counties Primary Disaster areas for 2015 due to drought. An additional 14 contiguous counties are also eligible federal for assistance.

Water Supply

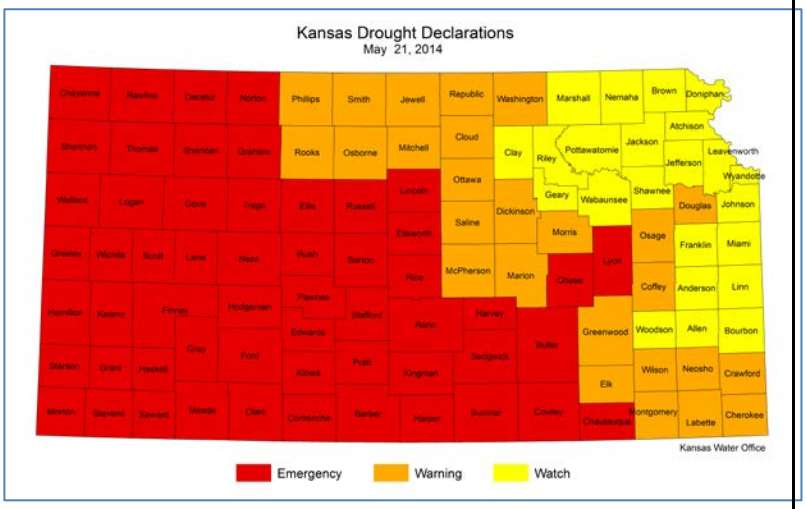
- Some supplies remain in Conservation Plan Stage 3 – Water Emergency: Ellis, McCracken, Medicine Lodge, Russell and Victoria.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration is in effect on the Saline, Little Arkansas and Chikaskia rivers.

Kansas County Drought Declarations: Executive Order 14-04 was issued by Governor Brownback May 21, 2014, modifying drought declarations for Kansas counties. Drought stages are in effect for all 105 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use. Crop and pasture conditions also play a role in declaration determination. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.

Drought Emergency:
Barber, Barton, Butler, Chase, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Lane, Lincoln, Logan, Lyon, Meade, Morton, Ness, Norton, Pawnee, Pratt, Rawlins, Reno, Rice, Rush, Russell, Scott, Sedgwick, Seward, Sheridan, Sherman, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wallace, Wichita.

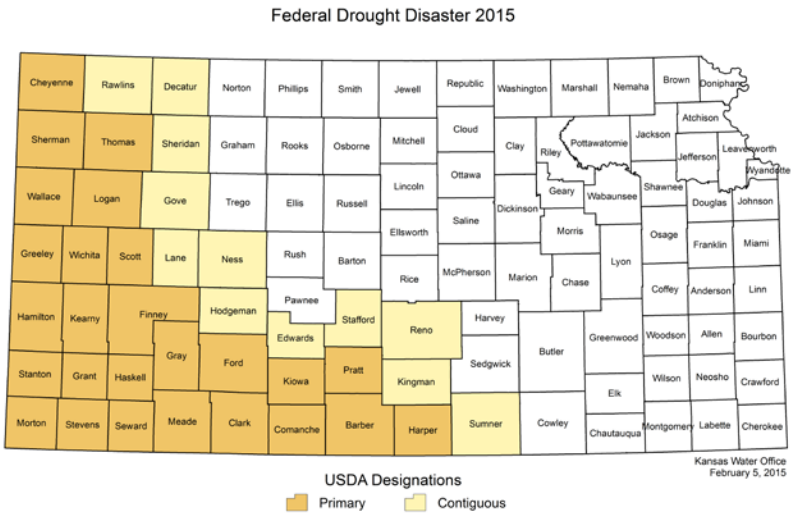


Drought Warning: Cherokee, Cloud, Coffey, Crawford, Dickinson, Douglas, Elk, Greenwood, Jewell, Labette, Marion, McPherson, Mitchell, Montgomery, Morris, Neosho, Osage, Osborne, Ottawa, Phillips, Rooks, Republic, Saline, Smith, Washington, Wilson.

Drought Watch: Allen, Anderson, Atchison, Bourbon, Brown, Clay, Doniphan, Franklin, Geary, Jackson, Jefferson, Johnson, Leavenworth, Linn, Marshall, Miami, Nemaha, Pottawatomie, Riley, Shawnee, Wabaunsee, Woodson, Wyandotte.

Federal: USDA has designated 26 Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Cheyenne, Clark, Comanche, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Thomas, Wallace and Wichita.

In addition 14 contiguous counties are also eligible for natural disaster assistance. These are Chautauqua, Cowley, Decatur, Edwards, Gove, Hodgeman, Kingman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford and Sumner.



Qualified farm operators in the designated areas eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, the Emergency Assistance for Livestock, Honeybees, and Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

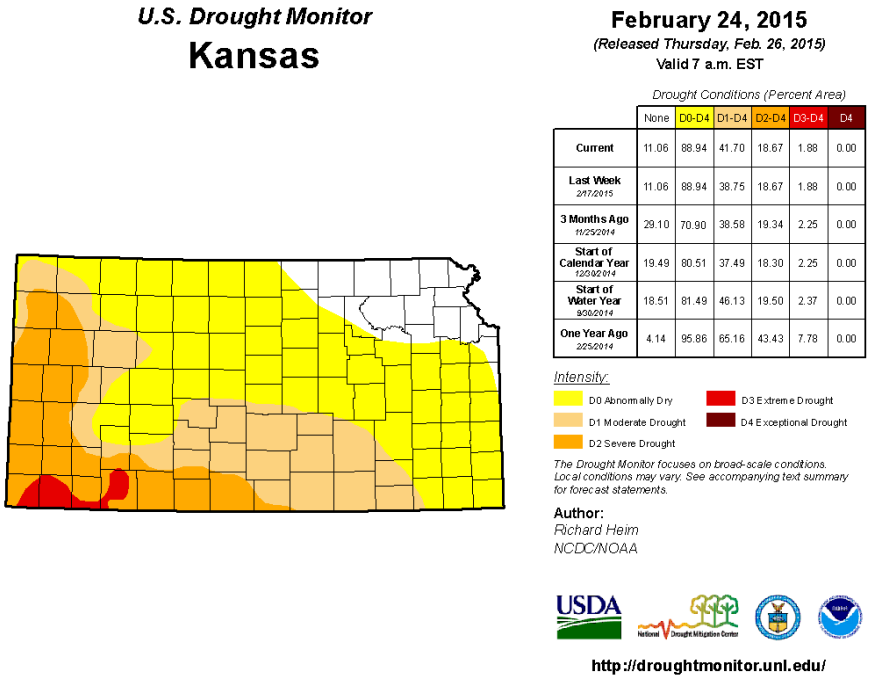
Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

General Conditions

Drought conditions persist across the state, particularly in the west. The drought-free portion of the state expanded slightly. The wet start to February brought a brief halt to further deterioration. However, a continued dry pattern is likely to result in a rapid expansion of more severe drought conditions. March is well into our wetter part of the year, and deficits can accumulate rapidly, particularly in the eastern third of the state.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

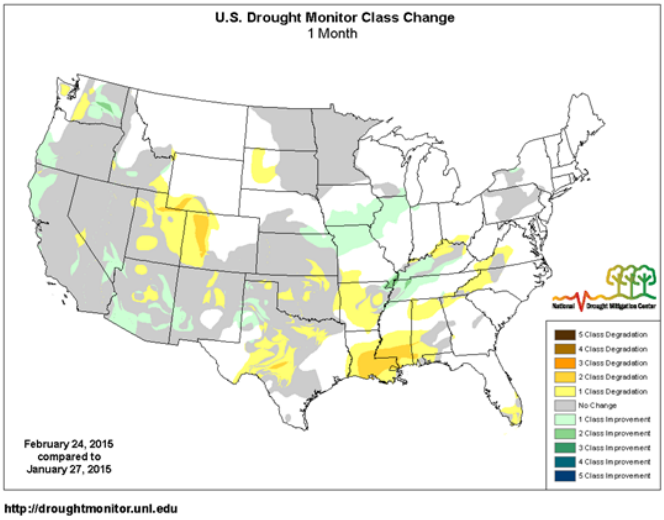


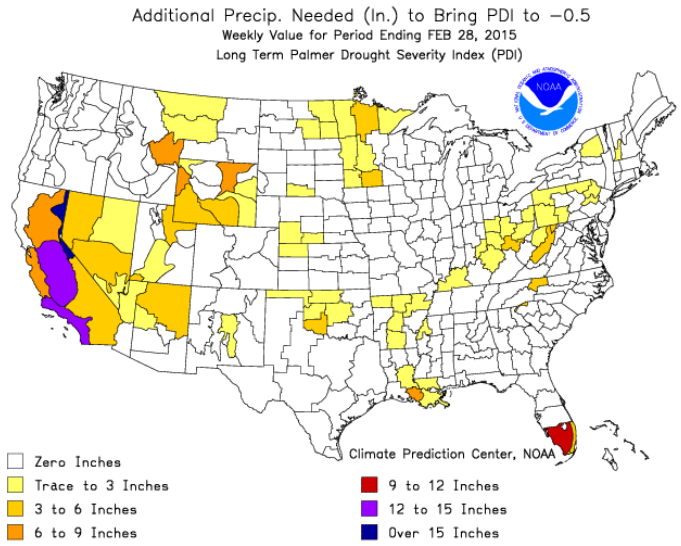
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	11.06	88.94	41.70	18.67	1.88	0.00
Last Week 2/17/2015	11.06	88.94	38.75	18.67	1.88	0.00
3 Months Ago 11/25/2014	29.10	70.90	38.58	19.34	2.25	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 2/25/2014	4.14	95.86	65.16	43.43	7.78	0.00

The El Niño conditions are now present in the Pacific, but are weak and an El Niño event has yet to be declared. As we move later into spring, the impacts are less consistent. Other global circulation patterns, including the North Atlantic Oscillation (NAO), can have significant impacts on the Spring season. Temperature at least 0.5 ^{o}C for 5 consecutive 3 month periods are required for an El Niño to be present. Other global circulation patterns, including the North Atlantic Oscillation (NAO), can have significant impacts on the winter season. El Niño conditions favor milder and wetter than normal conditions in Kansas during the winter but it is not the only global circulation pattern than can produce those conditions. When an El Niño is present there is an increased likelihood of wetter than normal conditions in the Central Plains.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next map and table provide climate division moisture needs to end drought.





Climate Division	Precipitation needed to End Drought (inches)			
	Week ending February 7	Week ending February 14	Week ending February 21	Week ending February 28
Northwest	1.86	2.46	2.04	2.24
West Central	-	-	-	-
Southwest	-	-	-	-
North Central	-	-	0.17	-
Central	-	-	-	-
South Central	-	-	-	-
Northeast	-	-	-	-
East Central	-	-	-	-
Southeast	-	-	-	-

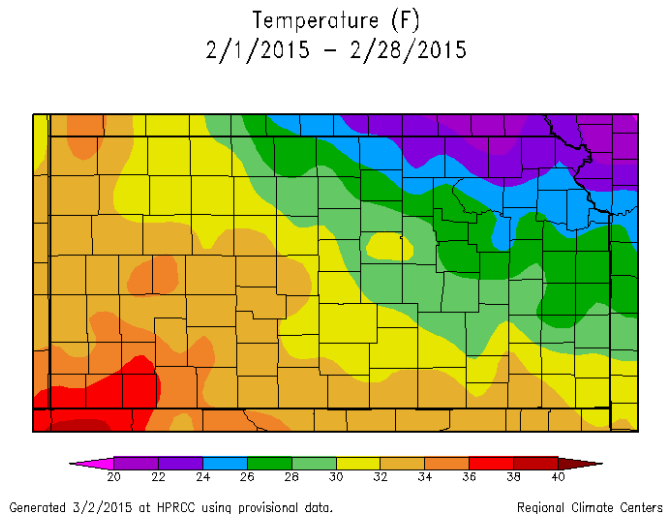
Climate Summary (Temperature and Precipitation)

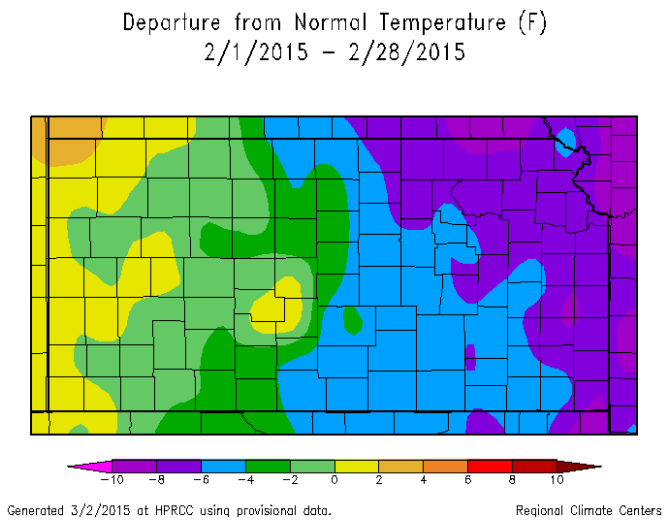
Despite some record warm readings at a few locations, February was characterized by colder than normal conditions. This was particularly true during the last week of the month when temperatures averaged 17 degrees cooler than normal. For the entire month of February, state-wide temperatures averaged 30.1°F which was 3.1 degrees cooler normal. This places it in the cold third of the average February temperatures, as the 31st coldest since 1895. The Northwest Division came closest to average at 31.0°F or exactly normal. The Northeastern Division saw the greatest departure. The average temperature for February in that region was 24.7°F, or 7.6 degrees cooler than normal. The colder than average temperatures didn't mean that the month was without warm weather. All divisions reached highs in the mid to upper seventies. The warmest reading for the month was 85°F at Hays 1ESE in Ellis County on the 8th. The coldest reading occurred at the middle of the month, as an Arctic front again moved into the state. The coldest reading was a -8°F at Howard, in Elk County, on the 19th. Sub-zero readings were recorded in all but the three southern divisions and the Central Division. There were 79 record maximum daily temperatures. None of these set new records for the month. There were 8 record daily warm minimum temperatures set and five records tied. On the cold side of things, 52 record daily low maximum temperatures were recorded and 15 records were tied. There were four record daily low minimum temperatures set, and 14 records tied.

The table below summarizes temperatures by climate division and various time periods. Please note the data used in compiling is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

	Kansas Climate Division Temperature Summary (°F)							
	February 1-28 , 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	46.2	16.9	31.6	0.0	81	7	-3	23
West Central	48.6	17.3	32.9	-0.1	83	7	-1	24
Southwest	49.8	20.4	35.1	-0.5	84	9	1	24
North Central	39.5	14.1	26.8	-5.3	81	8	-7	2
Central	43.3	17.0	30.1	-4.0	85	8	0	2
South Central	45.5	18.8	32.1	-4.4	78	7	3	15
Northeast	36.4	13.0	24.7	-7.6	73	8	-8	19
East Central	38.6	15.3	27.0	-6.8	73	8	-1	2
Southeast	41.8	18.8	30.3	-6.3	76	9	3	2
STATE	43.3	16.8	30.1	-3.9	85	8th	-8	19th
Data Source: KSU Weather Library								

Temperature summary by the High Plains Regional Climate Center for the month so far is provided in the maps below.

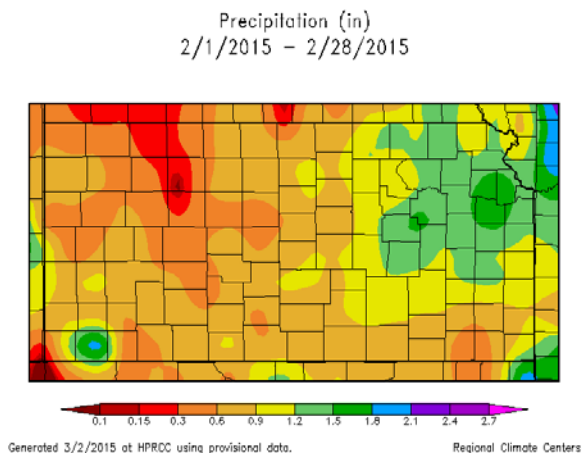


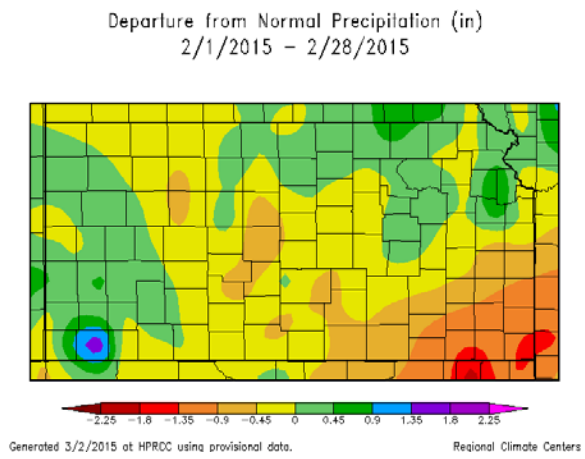


State-wide average precipitation was 0.88 inches which was 94 percent of normal. That deficit equals only 0.11 inches. The Northwest, West Central, Central, South Central and Southeastern divisions averaged below normal for the month. The Southeast Division had the lowest percentage of normal at 61 percent, which translates to a deficit of 0.68 inches for the month. The areas with greatest departure from normal only had slight increases. The Southwest Division saw 0.27 inches more than normal, which was 161 percent of normal. The Northeast division, which had the second largest percent of normal at 117 percent, was just 0.21 inches above normal. The remaining divisions with near normal conditions saw less than a tenth of inch more than normal. The wettest day of the month was on the 1st, when the average reported precipitation was 0.61 inches. The highest daily total reported for the CoCoRaHS network was 1.50 at Atchison 6.8 NNE, Atchison County on the 1st. This came as a mixed rain and snow event, with the highest amounts in the area where it was all rain. The highest 24hr total reported for the month at a National Weather Service Coop site was 1.28 inches at Bonner Springs, Wyandotte County, also on the 1st. Highest monthly total for the National Weather Service was 2.81 inches at Lawrence, Douglas County. The greatest monthly total for the CoCoRaHS network was 2.52 inches at Tonganoxie 6.3 SSW, Leavenworth County.

Kansas Climate Division Precipitation Summary (inches) Summary February 28, 2015												
Climate Division	February 1-28			February 1 – February 28			April 1 – February 28			September 1 – February 28		
	Actual	Depart [1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	0.33	-0.21	64	0.44	-0.55	46	16.66	-3.39	83	3.54	-1.92	66
West Central	0.38	-0.21	66	0.66	-0.44	59	19.67	0.31	100	4.64	-0.93	82
Southwest	0.82	0.27	161	1.32	0.30	134	19.25	0.71	102	6.23	0.75	113
North Central	0.87	0.05	98	1.18	-0.27	78	22.95	-3.04	87	6.6	-1.57	77
Central	0.89	-0.12	86	1.29	-0.41	76	25.95	-1.09	96	9.25	0.73	110
South Central	0.93	-0.23	81	1.30	-0.69	66	25.08	-3.61	87	6.98	-2.86	71
Northeast	1.33	0.21	117	1.52	-0.40	79	29.10	-3.62	88	10.85	-0.41	95
East Central	1.34	0.01	102	1.58	-0.70	70	28.49	-6.78	79	11.77	-0.82	91
Southeast	1.04	-0.68	61	1.35	-1.62	46	30.63	-7.84	79	13.97	-1.09	91
STATE	0.88	-0.11	94	1.20	-0.53	74	24.15	-3.11	89	8.21	-0.90	89

Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

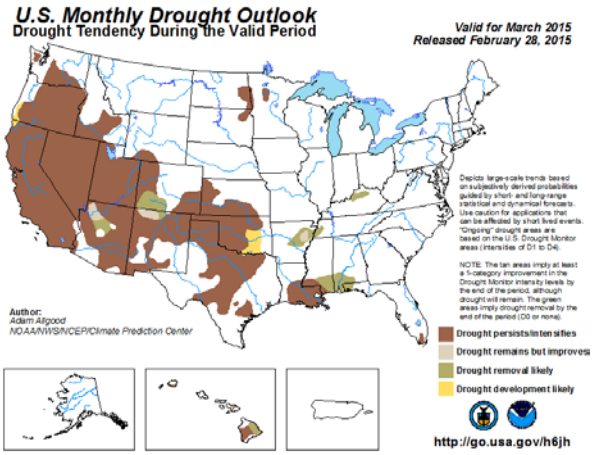


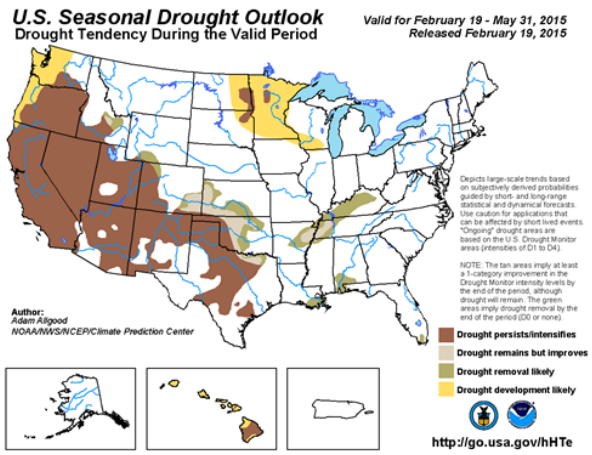


As typical, February was quiet on the severe weather side. There were snow events, but amounts were generally not troublesome. Highest daily total reported was 7 inches at Axtell, Marshall County (NWS), on the 1st (NWS) and 12.4 inches at Barnes, Washington County (CoCoRaHS) also on the first. Unfortunately, the moisture from the snow was limited**.**

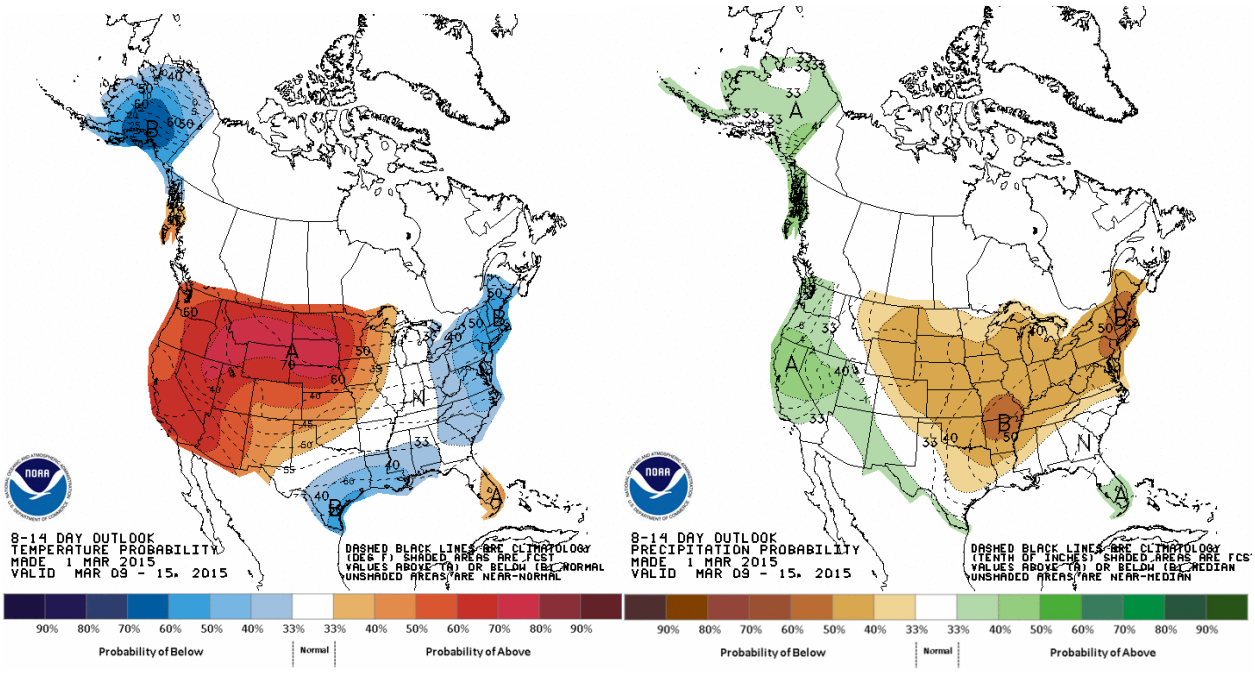
Future Outlook

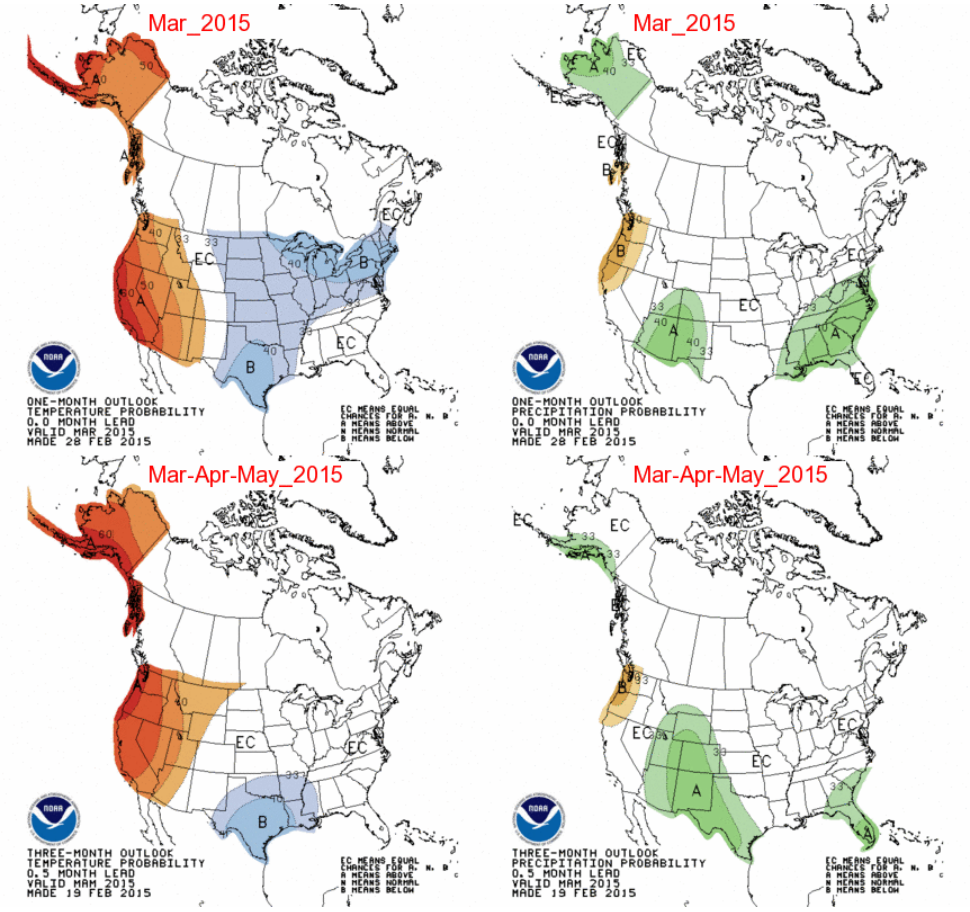
The March temperature outlook calls for cooler than normal conditions state-wide. The precipitation outlook is neutral, with precipitation equally likely to be above normal, normal or below normal. This does not indicate how that moisture might be distributed, and means rain/snow events or extended dry periods are both possible.





The short term (8-14 day) outlook favors above normal temperatures and below normal precipitation for Kansas. http://www.hprcc.unl.edu/products/maps/acis/hprcc/ks/MonthPDataHPRCC-KS.png.





Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

The most current list of public water suppliers known or required to be in conservation are included in Appendix A. As there are no reporting requirements for reporting water supply stages this list is based on the best information available.

Surface Water Supply Conditions

Kansas River basin: Storage in Perry, Tuttle Creek, and Milford reservoirs remained healthy throughout the month of February. Inflow was sufficient to maintain collective releases above minimum discharge to support Kansas River stream flow. Clinton Reservoir received little inflow over the month but experienced a slight increase in storage.

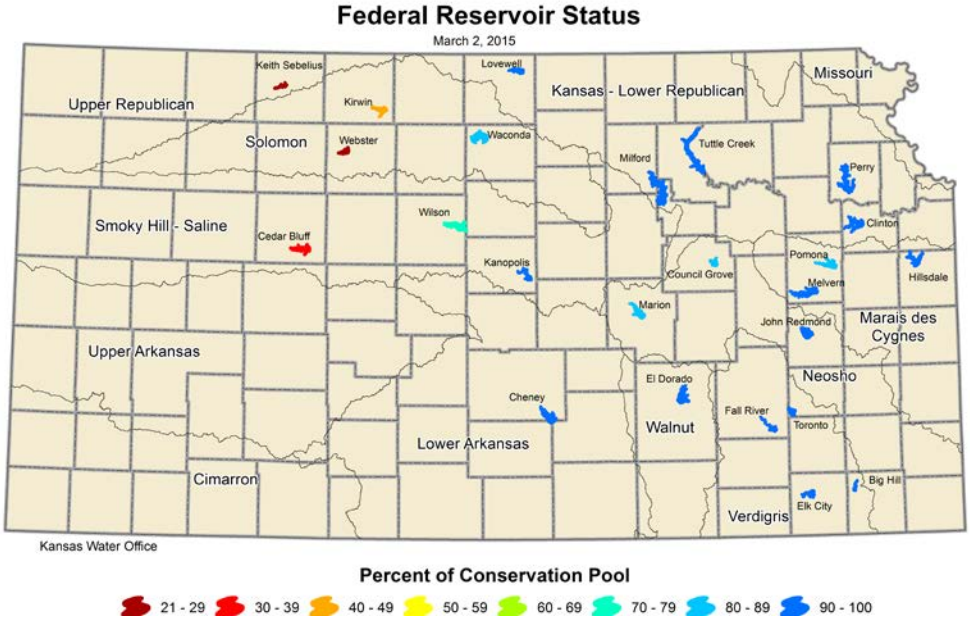
Marais des Cygnes basin: After a slight storage gain at the beginning of the month Pomona, Melvern, and Hillsdale reservoirs received very little inflow during the month February. However, Hillsdale maintained elevation at the lower target level while Pomona and Melvern declined. Minimum releases were sufficient to meet demands and maintain stream flow of the Marias des Cygnes River. The lower Marais des Cygnes ran well above low flow targets.

Cottonwood / Neosho basin: Stream flow in the Cottonwood and lower Neosho rivers were sufficient to meet demands and in-stream needs but Council Grove Reservoir releases were necessary to support demands in the upper Neosho. Storage in Council Grove and Marion reservoirs experienced minimal decline. John Redmond Reservoir conservation storage was full all month.

Verdigris basin: All reservoirs received inflow and remained at or above normal pool level. Supplemental releases were not necessary to meet target flows.

Smoky Hill basin: The Smoky Hill basin remains dry. Kanopolis Reservoir had very little inflow but the pool remained above conservation elevation and discharged through the uncontrolled notch through the month. Downstream flow was sufficient and above the low flow target at Mentor.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

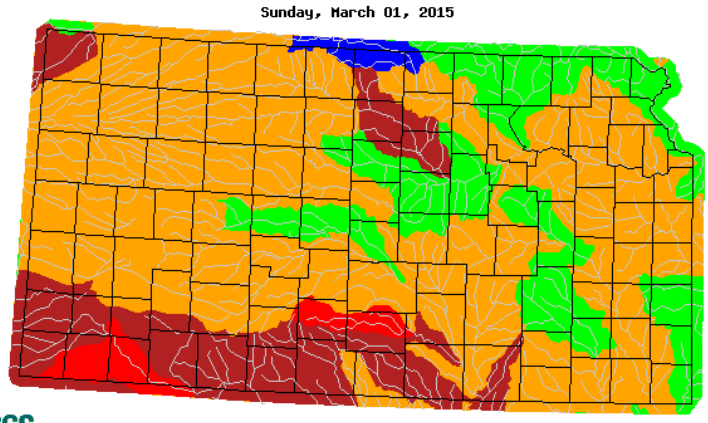
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**3/2/2015 6:00 AM**		
Norton[1]	2304.3	2288.27	-16.03	28.8
Harlan County, NE	1945.73	1932.77	-12.96	53.0
Lovewell[1]	1582.6	1582.17	-0.43	96.5
Milford[1]	1144.4	1142.90	-1.50	93.9
Cedar Bluff	2144	2120.92	-23.08	35.3
Kanopolis[1]	1463	1464.14	1.14	100.0
Wilson[1]	1516	1507.72	-8.28	71.9
Webster[1]	1892.5	1871.01	-21.44	24.9
Kirwin[1]	1729.3	1715.56	-13.69	43.5
Waconda[1]	1455.6	1453.42	-2.18	88.0
Tuttle Creek[1]	1075	1076.35	1.35	100.0
Perry[1]	891.5	891.60	0.10	100.0
Clinton[1]	875.5	874.55	-0.95	94.3
Melvern[1]	1036	1034.00	-2.00	91.1
Pomona[1]	974	972.04	-1.96	86.6
Hillsdale[1]	917	915.90	-1.10	93.3
Arkansas River Basin		**3/2/2015 8:00 AM**		
Cheney	1421.6	1420.17	-1.43	92.0
El Dorado	1339	1336.49	-2.51	89.0
Toronto[1]	901.5	901.69	0.19	100.0
Fall River[1]	948.5	948.85	0.35	100.0
Elk City[1]	796	796.01	0.01	100.0
Big Hill	858	857.71	-0.29	99.0
Council Grove[1]	1274	1271.15	-2.85	83.0
Marion[1]	1350.5	1348.84	-1.66	88.0
John Redmond[1]	1039	1041.35	0.35	100.0

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

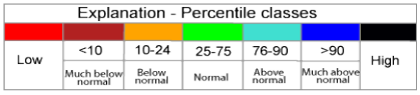
Streamflow Conditions

The comparison of below normal streamflow for historical is shown on the map below left.



USGS

In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



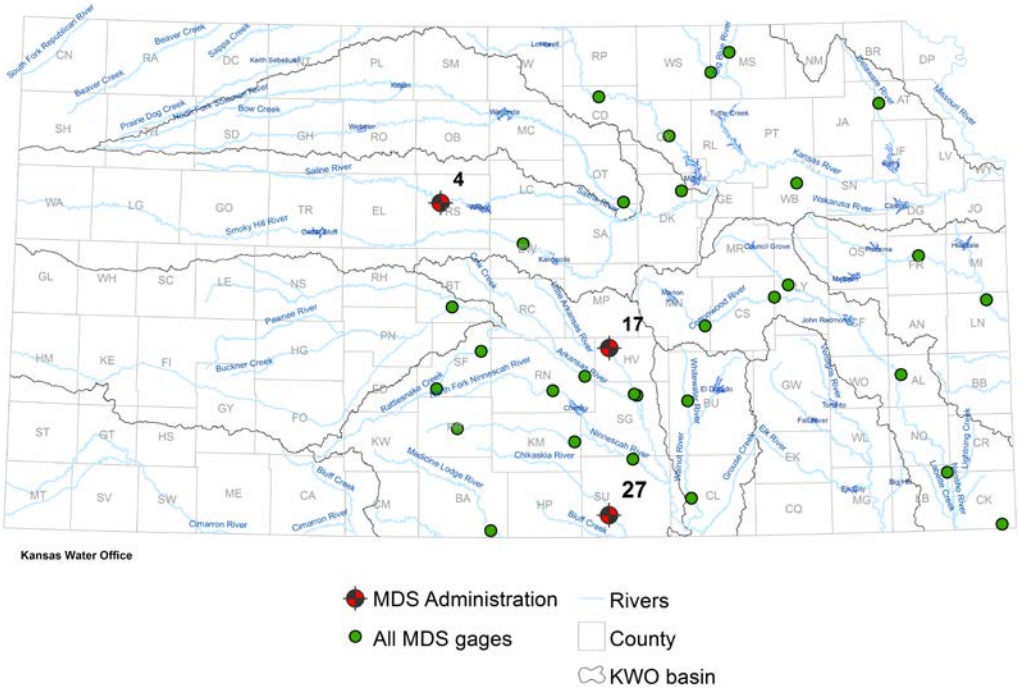
Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is not being administered anywhere in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

A total of 25 water right files are under administration on the streams as indicated in the table below.

Streamflows in cubic feet per second (cfs)									
Gaging Station	**Flow February 5**	**Flow February 12**	**Flow February 19**	**Flow February 26**	**February MDS**	**March MDS**	**Administration Date**	**Number of Rights Admin.**	**Map Location**
Republican River at Concordia	ice	ice	ice	ice	125	150			
Republican River at Clay Center	ice	124	ice	ice	150	200			
Saline River near Russell	2	2	2	2	5	15	10/22/2014	8	4
Chapman Creek near Chapman	ice	16	ice	ice	15	15			
Little Arkansas at Alta Mills	8	9	4	6	8	8	01/16/2015	10	17
Whitewater River near Towanda	na	na	14	15	15	15			
Medicine Lodge River near Kiowa	na	ice	ice	62	55	60			
Chikaskia River near Corbin	18	32	ice	ice	45	50	02/23/2015	7	27

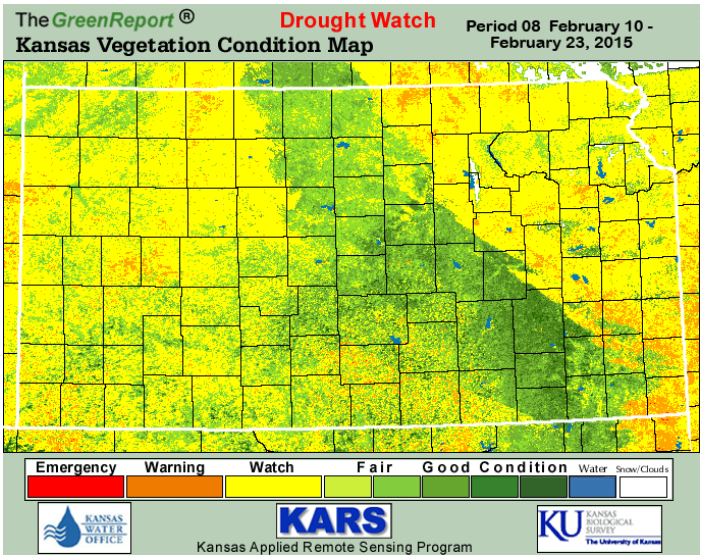
Kansas Minimum Desirable Streamflow (MDS) Gages Administration
February 26, 2015

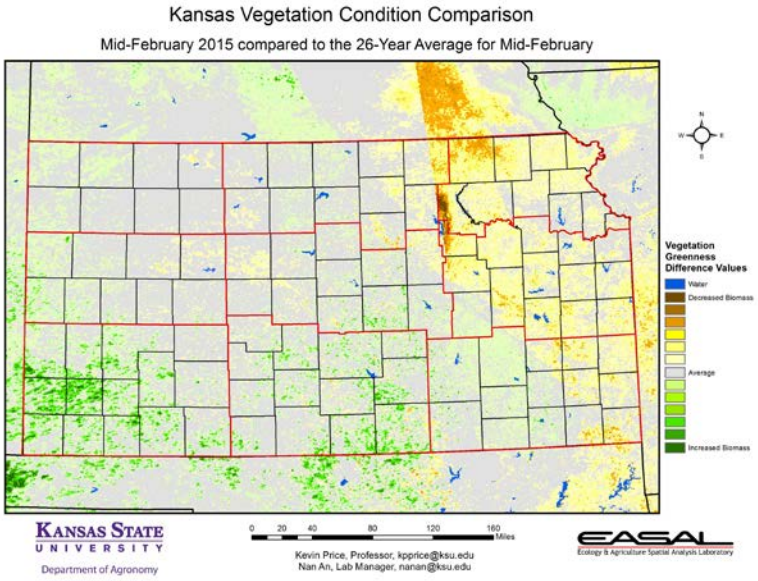


Soil, Crop and Vegetation

Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. All looks normal for this time of year. The southeast and northwest areas of the state appear to be in great shape as of February 23rd. Wheat acres in the south central Kansas are doing well also. Large swath of green shows areas of recent snowfall/moisture. The K-State Vegetative Condition Comparison to historical data is also provided below.

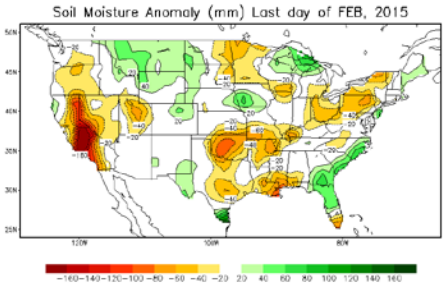




Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for February 10 – 23 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that highest NDVI values are in the Southwestern counties. This area has had warmer and wetter than average conditions for the period. The lower photosynthetic activity depicted in northeastern Kansas is largely due to a splicing issue.

Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology.
http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml



Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. During the winter months this report is monthly rather than weekly. The next report will be released December 30, 2014. For the week ending November 30, 2014 USDA news release reported topsoil moisture rated 13 percent very short, 33 percent short, 54 percent adequate, and 0 percent surplus. Subsoil moisture rated 16 percent very short, 32 percent short, 52 percent adequate, and 0 percent surplus.

Pasture and range conditions rated 8 percent very poor, 16 poor, 43 fair, 31 good, and 2 excellent. Stock water supplies rated 8 percent very short, 21 short, 71 adequate, and 0 surplus.
http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.

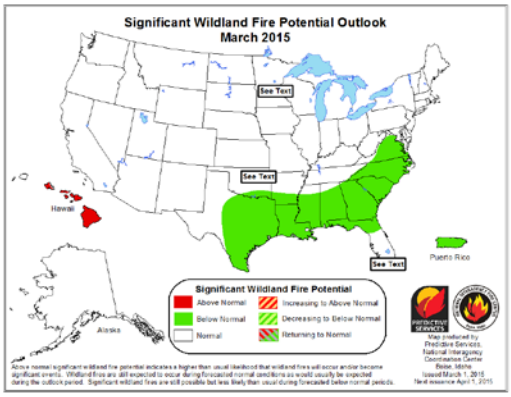
Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

Burn Bans and Fires

The Predictive Services section at the National Interagency Fire Center's Wildland Fire provides monthly fire hazard predictions. http://www.predictiveservices.nifc.gov/outlooks/outlooks.htm



General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's Natural Resources Conservation Service (NRCS) administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance

in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at:
http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A
Known Conservation Stages
February 28, 2015

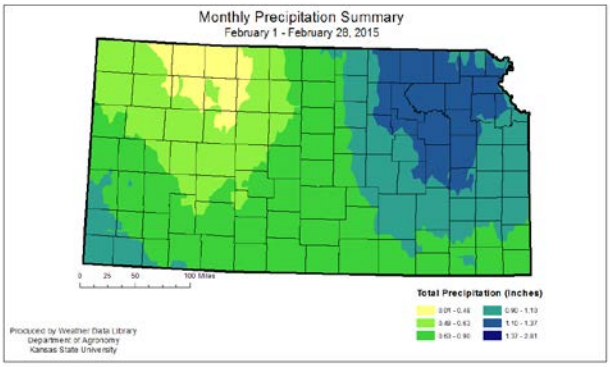
Public Water Supply	County	Conservation Stage	2014 Stage[1]	Comment[2]
Ellis	Ellis	Water Emergency	3	
McCracken	Rush	Water Emergency	3	July 3, 2013/Dec. 22, 2013
Medicine Lodge	Barber	Water Emergency	3	July 1, 2013
Russell	Russell	Water Emergency	3	Stage 4 equivalent to other Stage 3
Victoria	Ellis	Water Emergency	3	March 1, 2014, Warning April 15, 2013
Ellsworth	Ellsworth	Water Warning	2	1/6/14 chg stage 3 to 2
Scott City	Wichita	Water Warning	2	May 2014
Abilene	Dickinson	Water Warning	1	Stage 2- 7/25/13, Stage 3 –level 1, 4/22/13, Stage 2

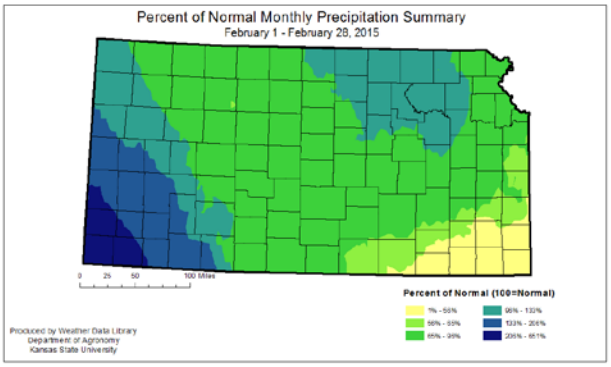
[1] 1 = Water Watch
2 = Water Warning
3 = Water Emergency

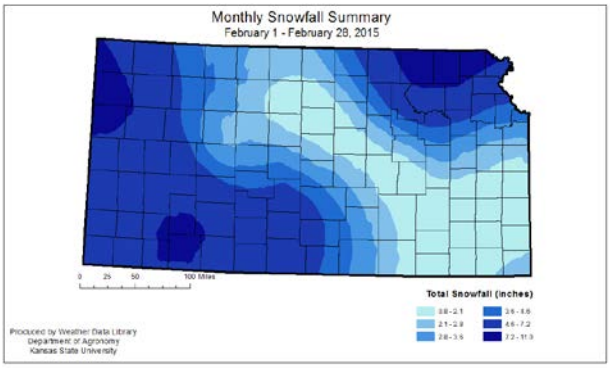
[2] CN Assurance = Cottonwood & Neosho River Water Assurance District
K Assurance = Kansas River Water Assurance District
M Assurance = Marais des Cygnes River Water Assurance District
Marketing = Water Marketing Program

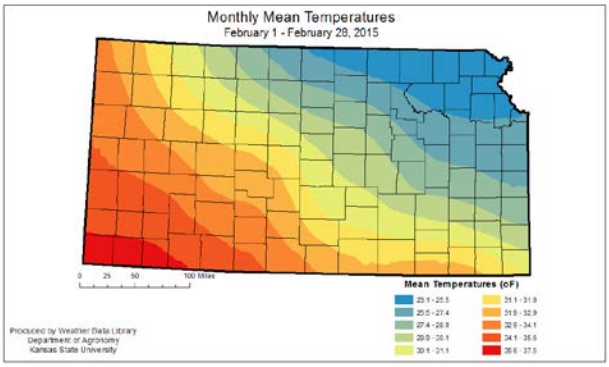
APPENDIX B

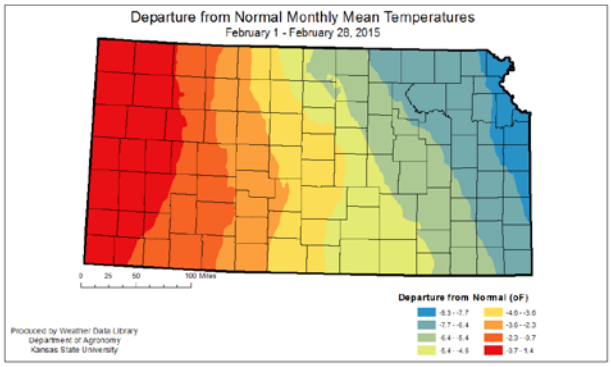
Precipitation, Snowfall and Temperature Maps from Kansas Weather Data Library











Appendix C

February 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	0.86	0.44	105	32.8	1.1	77 (7,6)	-4 (23)
Dodge City	0.64	-0.04	94	34.0	-1.9	79 (7)	6 (24)
Garden City	0.39	-0.15	72	32.7	-2.1	79 (7)	2 (24)
Goodland	0.80	0.31	161	33.1	0.8	79 (7)	5 (23, 1)
Guymon, OK	0.74	0.27	Na	38.6	0.0	85 (7)	13 (27,24)
Hill City	0.19	-0.33	23	31.8	-1.1	82 (7)	0 (23)
Lamar, CO	0.57	0.20	Na	34.6	1.0	82 (7)	-3 (23)
McCook, NE	0.22	-0.40	35	32.8	1.9	80 (7)	0 (23)
Springfield, CO	0.80	0.36	Na	34.4	-1.0	81 (7)	3 (23)
Central							
Concordia	0.35	-0.44	44	27.6	-5.1	73 (7)	-2 (2)
Hebron, NE	-	-	-	24.3	-5.3	64 (8)	-7 (5,2)
Medicine Lodge	0.55	-0.49	53	33.1	-5.1	75 (8)	9 (2)
Ponca City, OK	0.23	-1.11	Na	34.9	-4.8	79 (8)	10 (2)
Salina	0.12	-1.05	10	31.2	-4.3	74 (7)	6 (2)
Wichita (ICT)	0.54	-0.64	Na	32.2	-5.0	74 (8)	7 (2)
East							
Bartlesville, OK	0.63	-1.34	Na	33.2	-6.6	80 (8)	9 (2)
Chanute	0.68	-1.22	19	30.6	-6.8	73 (8)	7 (27)
Fall City, NE	0.52	-0.42	Na	22.9	-8.0	57 (7)	-15 (5)
Johnson Co. Exec. Apt	0.82	-0.75	Na	26.9	-7.9	67 (8)	3 (19)
Joplin, MO	0.82	-1.50	Na	31.2	-8.5	73 (8)	8 (27,19)
Kansas City (MCI), MO	0.98	-0.48	Na	25.2	-8.3	62 (8,7)	0 (27)
St. Joseph, MO	0.60	-0.33	Na	22.3	-9.7	58 (7)	-10 (19)
Topeka (TOP	0.87	-0.45	66	27.0	-7.4	69 (8)	0 (5)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS DROUGHT UPDATE –March 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General – Drought

- Executive Order 14-04 issued by Governor Brownback May 21, 2014, remains in effect. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.
- The US Drought Monitor indicated dry conditions persist across 93.5 percent of Kansas at the end of March. Moderate drought (D1) or worse was affecting 69 percent of the state.
- USDA declared 27 Kansas Counties Primary Disaster areas for 2015 due to drought. An additional 15 contiguous counties are also eligible federal for assistance.

Water Supply

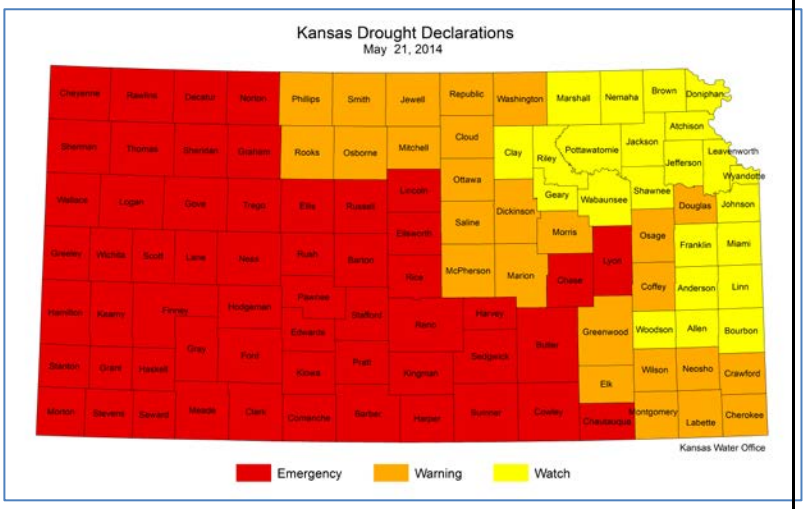
- Some supplies remain in Conservation Plan Stage 3 – Water Emergency: Ellis, McCracken, Medicine Lodge, Russell and Victoria.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration is in effect on the Saline, Little Arkansas and Chikaskia rivers.

Kansas County Drought Declarations: Executive Order 14-04 was issued by Governor Brownback May 21, 2014, modifying drought declarations for Kansas counties. Drought stages are in effect for all 105 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use. Crop and pasture conditions also play a role in declaration determination. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.

Drought Emergency:
Barber, Barton, Butler, Chase, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Lane, Lincoln, Logan, Lyon, Meade, Morton, Ness, Norton, Pawnee, Pratt, Rawlins, Reno, Rice, Rush, Russell, Scott, Sedgwick, Seward, Sheridan, Sherman, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wallace, Wichita.

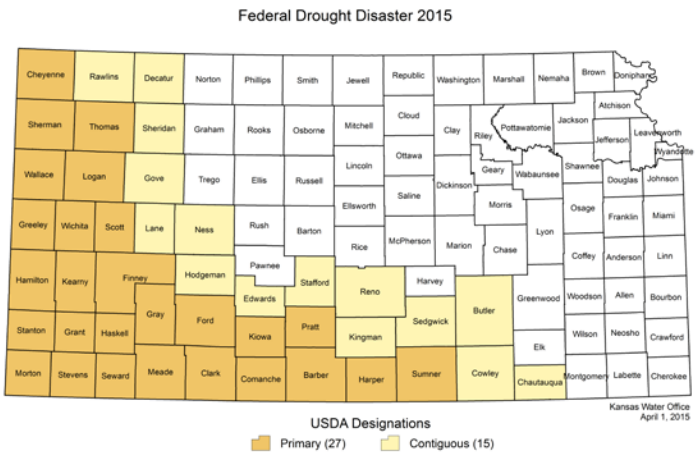


Drought Warning: Cherokee, Cloud, Coffey, Crawford, Dickinson, Douglas, Elk, Greenwood, Jewell, Labette, Marion, McPherson, Mitchell, Montgomery, Morris, Neosho, Osage, Osborne, Ottawa, Phillips, Rooks, Republic, Saline, Smith, Washington, Wilson.

Drought Watch: Allen, Anderson, Atchison, Bourbon, Brown, Clay, Doniphan, Franklin, Geary, Jackson, Jefferson, Johnson, Leavenworth, Linn, Marshall, Miami, Nemaha, Pottawatomie, Riley, Shawnee, Wabaunsee, Woodson, Wyandotte.

Federal: USDA has designated 27 Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Cheyenne, Clark, Comanche, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 15 contiguous counties are also eligible for natural disaster assistance. These are Butler, Chautauqua, Cowley, Decatur, Edwards, Gove, Hodgeman, Kingman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford and Sumner.



Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

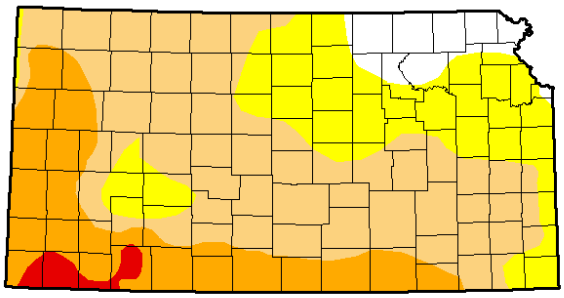
Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

General Conditions

Drought conditions persist across the state, particularly in the west. There was widespread degradation in the western portions of the state. The drought-free portion of the state shrunk to nearly zero.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.



U.S. Drought Monitor

Kansas

March 31, 2015

(Released Thursday, Apr. 2, 2015)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	6.52	93.48	68.70	22.45	1.88	0.00
Last Week 3/24/2015	7.24	92.76	68.70	22.45	1.88	0.00
3 Months Ago 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 4/1/2014	0.00	100.00	98.79	64.91	14.34	0.00

Intensity:

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

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

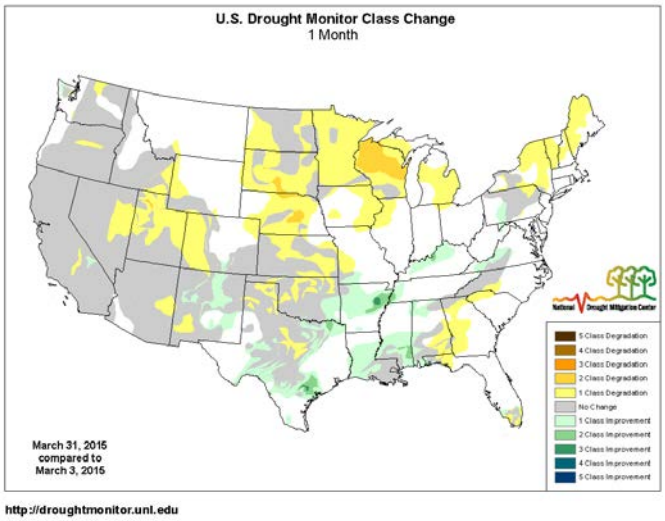
Author:
Eric Luebehusen
U.S. Department of Agriculture

http://droughtmonitor.unl.edu/

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

While an El Niño/Southern Oscillation (ENSO) continues it is weak and the impacts are uncertain. Other global circulation patterns, including the North Atlantic Oscillation (NAO), can have significant impacts on the spring season. Temperature at least 0.5 ^{o}C for 5 consecutive 3 month periods are required for an El Niño to be present. Other global circulation patterns, including the North Atlantic Oscillation (NAO), can have significant impacts on the winter season. El Niño conditions favor milder and wetter than normal conditions in Kansas during the winter but it is not the only global circulation pattern than can produce those conditions. When an El Niño is present there is an increased likelihood of wetter than normal conditions in the Central Plains.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

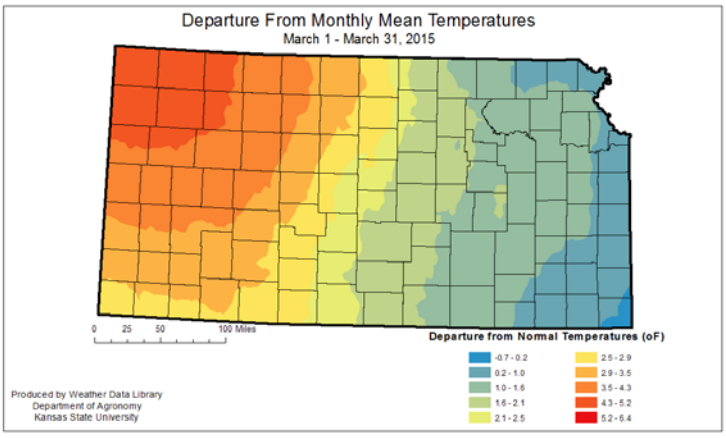


The next table provides climate division moisture needs to end drought.

Climate Division	Precipitation needed to End Drought (inches)			
	Week ending March 7	Week ending March 14	Week ending March 21	Week ending March 28
Northwest	2.68	3.41	4.10	4.63
West Central	-	0.61	1.05	1.38
Southwest	-	-	-	-
North Central	0.55	2.35	3.00	3.23
Central	-	-	0.65	1.05
South Central	-	-	0.55	1.04
Northeast	-	-	-	-
East Central	-	-	-	-
Southeast	-	-	-	0.71

Climate Summary (Temperature and Precipitation)

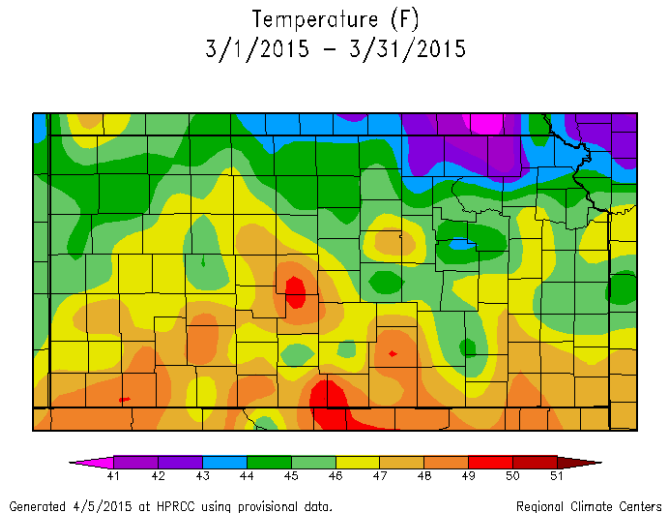
March lived up to its reputation as a transitional month. Overall, the temperatures averaged 45.7 °F, which was 2.4 degrees warmer than normal. It ranks as 33rd warmest since 1895 or in the warmest third of the period of record. This tells only part of the story, as temperatures went from lows in the single digits at the beginning of the month to highs above 90 °F in the middle of the month. The warmest departures from average were in the Northwestern Division, while the coolest conditions prevailed in the Southeastern Division. The highest temperature recorded for the month was 95 °F at Norton Dam (Norton County) on the 17th. The coolest reading for the month was 1 °F at Mankato (Jewell County) on the 5th. With the warmer than average temperatures for the month, it is not surprising that 79 new record daily highs were set. None of those records were new record highs for the month. More surprising is the fact that we still had 4 record low daily maximums. On the low temperature side, few records were set. There were 2 record low minimums set and 2 record high minimums recorded.

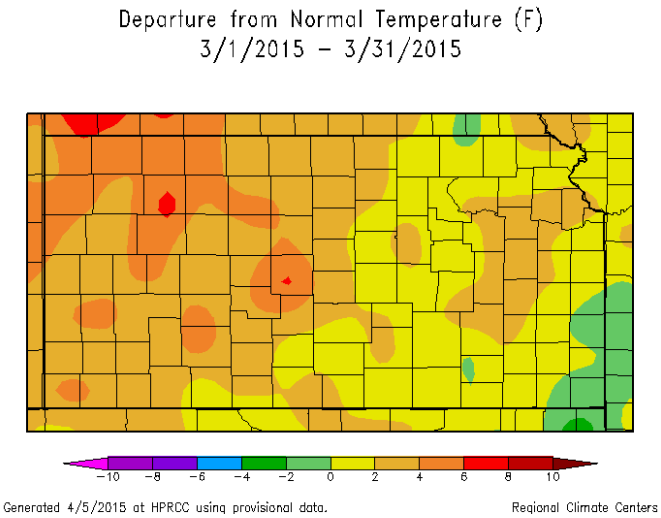


The table below summarizes temperatures by climate division and various time periods. Please note the data used in compiling is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

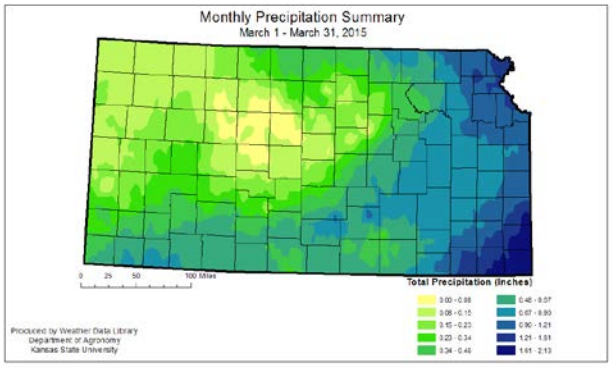
	Kansas Climate Division Temperature Summary (°F)							
	March 2015							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	62.5	27.3	44.9	4.7	95	17	4	6
West Central	62.5	28.2	45.4	3.8	94	17	8	5
Southwest	63.5	31.3	47.4	3.3	93	17	7	5
North Central	60.7	28.4	44.6	2.4	93	17	1	5
Central	62.4	29.9	46.1	2.4	90	17	6	5
South Central	62.4	32.4	47.4	1.9	88	16	5	6
Northeast	58.1	29.9	44.0	1.4	87	17	4	5
East Central	58.5	31.2	44.9	1.1	87	17	5	2
Southeast	59.3	33.9	46.6	0.7	82	16	6	5
STATE	61.1	30.3	45.7	2.4	95	8th	1	19th
Data Source: KSU Weather Library								

Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.





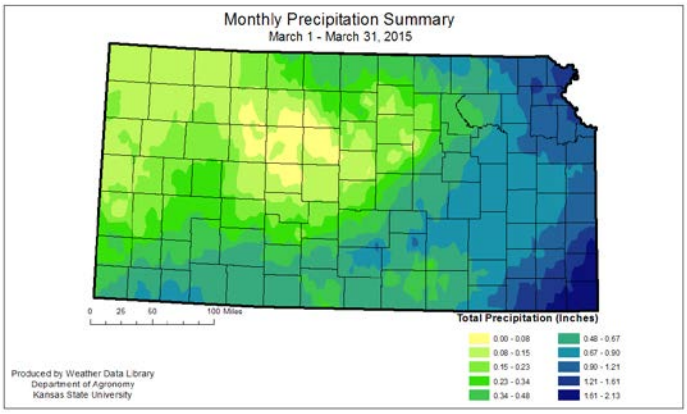
State-wide average precipitation was 0.45 inches which was just 19 percent of normal. Unfortunately, that deficit averages -1.67 inches. The Northwest and West Central divisions average less than 10 percent of normal for the month. The Southwestern Division came closest to normal with an average of 0.46 inches, or 34 percent of normal. The Southeastern Division had the highest average amount at 0.92 inches. Unfortunately, they typically see more precipitation in March than other divisions, and that amount translates to just 29 percent of normal. State-wide, the wettest day of the month was on the 26th, when the average reported precipitation was 0.12inches, with the highest amount reported that day just 0.52 inches. However, the highest daily total reported for the CoCoRaHS network was 1.35 reported at Sabetha 0.3 SW, Nemaha County on the 24th. The highest 24hr total reported for the month at a National Weather Service Coop site was 1.00 inch at Liberal, Seward County, on the 20th. Highest monthly total for the National Weather Service was 1.67 inches at Pittsburg, Crawford County. The greatest monthly total for the CoCoRaHS network was 2.04 inches at Fort Scott 0.6 SW, Bourbon County. Snowfall was concentrated at the beginning of the month, with the highest totals reported in the South Central and Southeastern divisions.

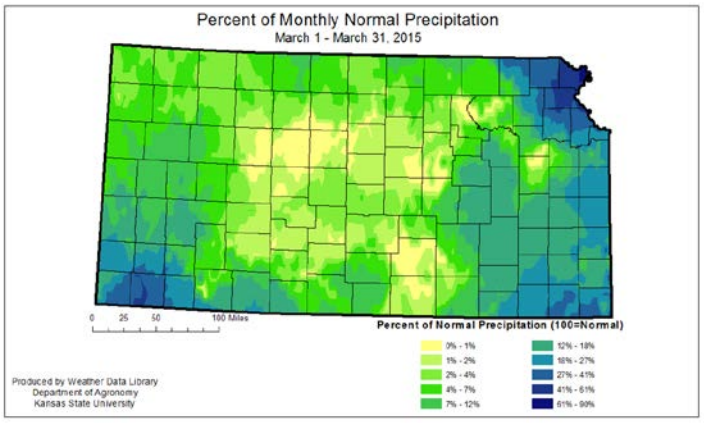


Greatest monthly totals were 5.7 inches at Wichita 9.0 E, Sedgwick County (CoCoRaHS) and eight inches at Independence, Montgomery County (NWS).

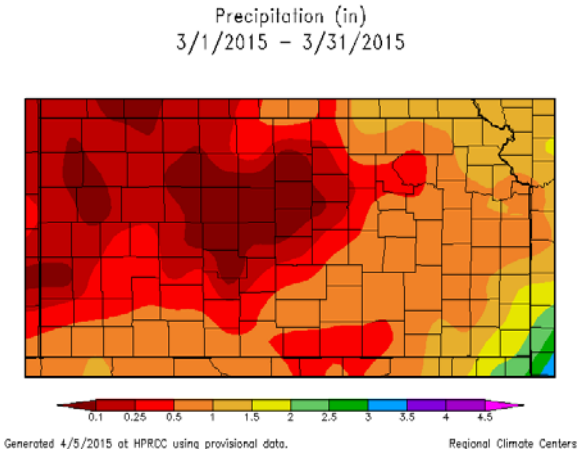
Kansas Climate Division Precipitation Summary (inches)
Summary March 2015

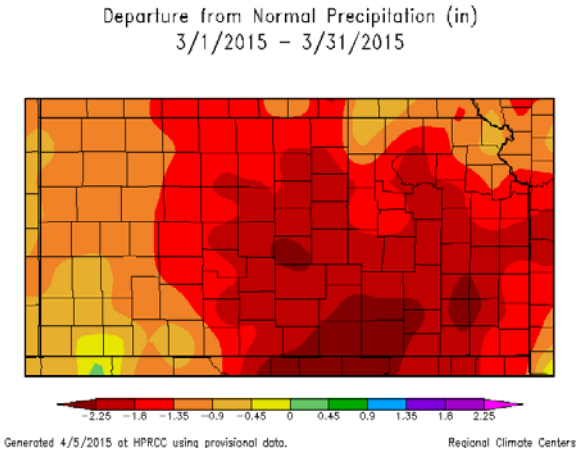
Climate Division	March 1-31			March 1 – March 31			April 1 – March 31			September 1 – March 31		
	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	0.06	-1.25	4	0.53	-1.77	24	16.75	-4.61	78	3.63	-3.14	54
West Central	0.09	-1.31	6	0.84	-1.66	34	19.86	-0.91	94	4.82	-2.15	68
Southwest	0.46	-0.90	34	1.83	-0.55	79	19.77	-0.13	98	6.74	-0.10	98
North Central	0.25	-1.77	11	1.31	-2.16	36	23.08	-4.93	81	6.72	-3.47	63
Central	0.32	-1.93	13	1.48	-2.47	37	26.14	-3.15	89	9.44	-1.32	88
South Central	0.47	-2.16	18	1.63	-2.99	36	25.41	-5.91	81	7.31	-5.16	59
Northeast	0.68	-1.60	29	2.13	-2.08	50	29.72	-5.28	84	11.46	-2.08	83
East Central	0.67	-1.98	25	2.12	-2.80	43	29.03	-8.89	75	12.31	-2.93	79
Southeast	0.92	-2.10	29	2.04	-3.96	33	31.33	-10.16	75	14.66	-3.42	79
STATE	0.45	-1.67	19	1.57	-2.28	42	24.52	-4.86	84	8.58	-2.65	75





Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

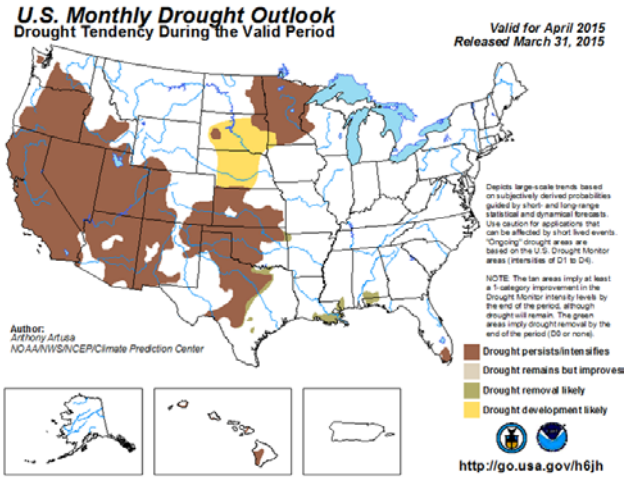


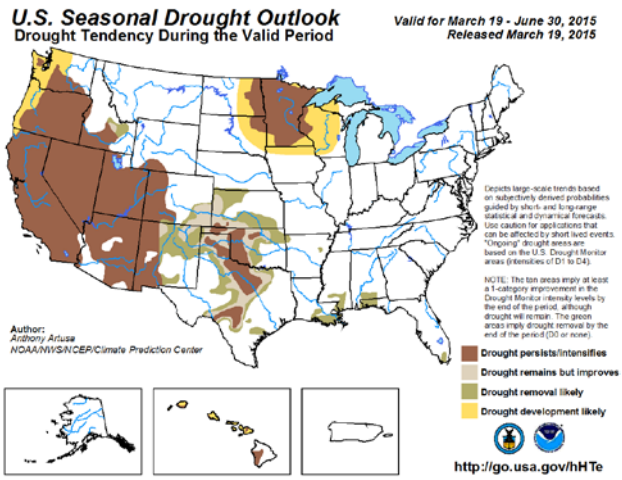


Few severe weather events were reported in March. A major snow event occurred at the first of the month, with highest totals in the Southeastern Division. There were also 13 hail events, most occurring in the South Central and Southeastern divisions.

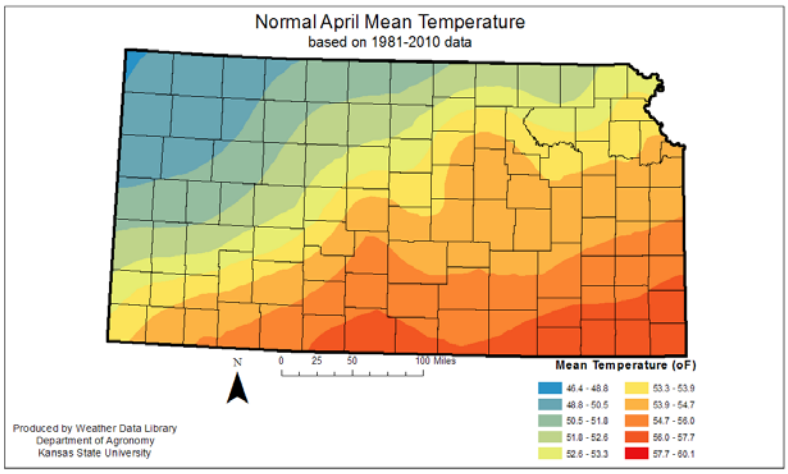
Future Outlook

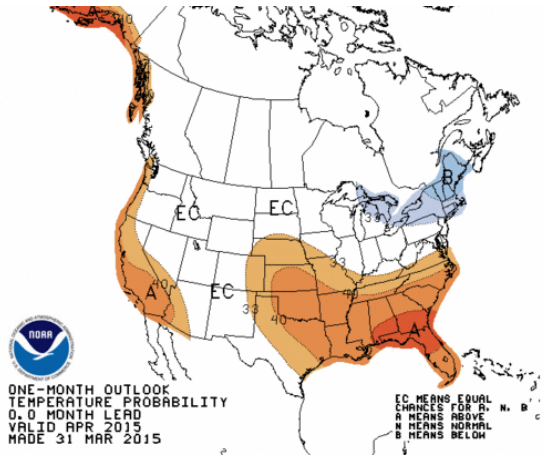
The precipitation outlook is for drier than normal conditions. This does not indicate how that moisture might be distributed. Given the monthly outlooks, drought conditions are likely to intensify over the next month.

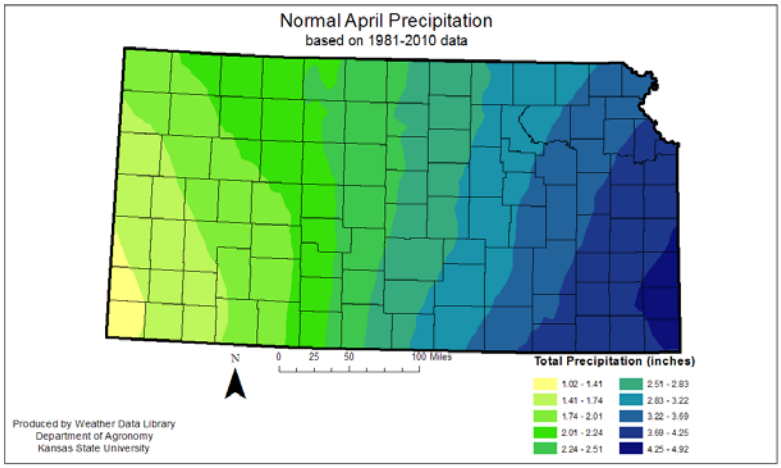


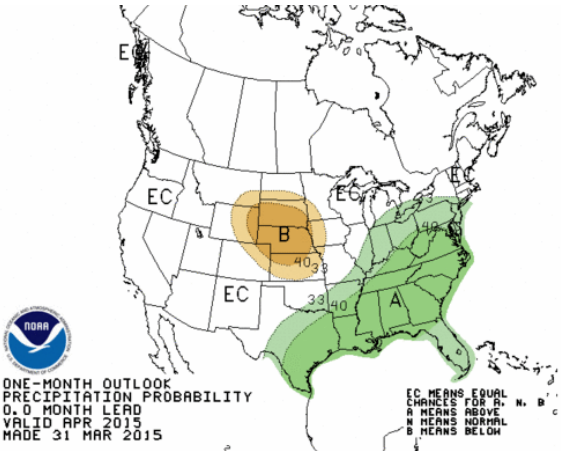


April outlook and normal Kansas April temperatures and precipitation are compared below. Temperatures are equally likely to be above, normal, normal or below normal for April. Precipitation is more likely to be below normal.

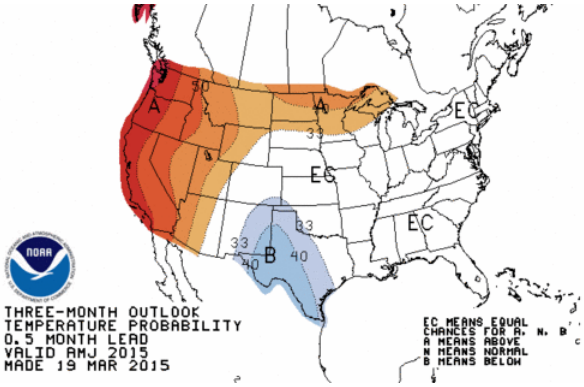


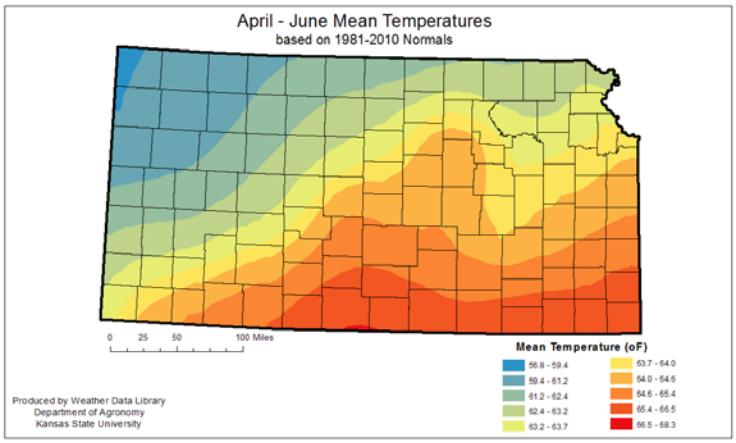


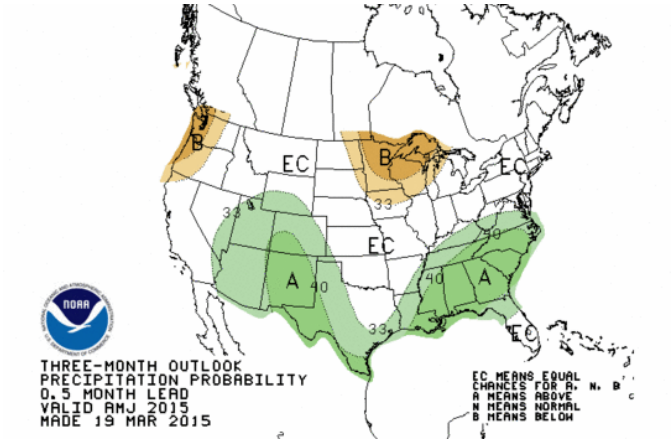


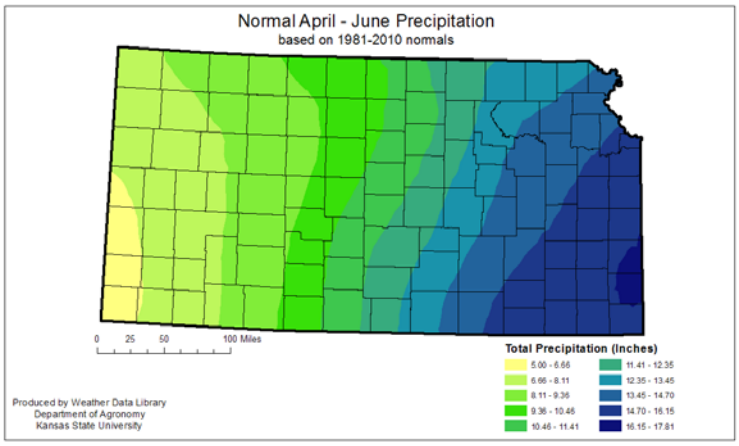


The three-month outlook for temperatures and precipitation favor equal chances of below normal, normal or above normal for April through June.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

The most current list of public water suppliers known or required to be in conservation are included in Appendix A. As there are no reporting requirements for reporting water supply stages this list is based on the best information available.

Surface Water Supply Conditions

Kansas River basin: Releases from Perry and Tuttle Creek were made in March to provide a storage buffer before spring runoff, intended to benefit fish spawn. Having already lowered the pool level in early winter, Milford maintained elevation at about 1.5 feet below the top of conservation pool throughout the month. The deficit in conservation storage of these three reservoirs is not related to drought. Inflow was sufficient to maintain collective releases above minimum discharge to support Kansas River stream flow. Clinton Reservoir received little inflow over the month and experienced a slow decline in storage.

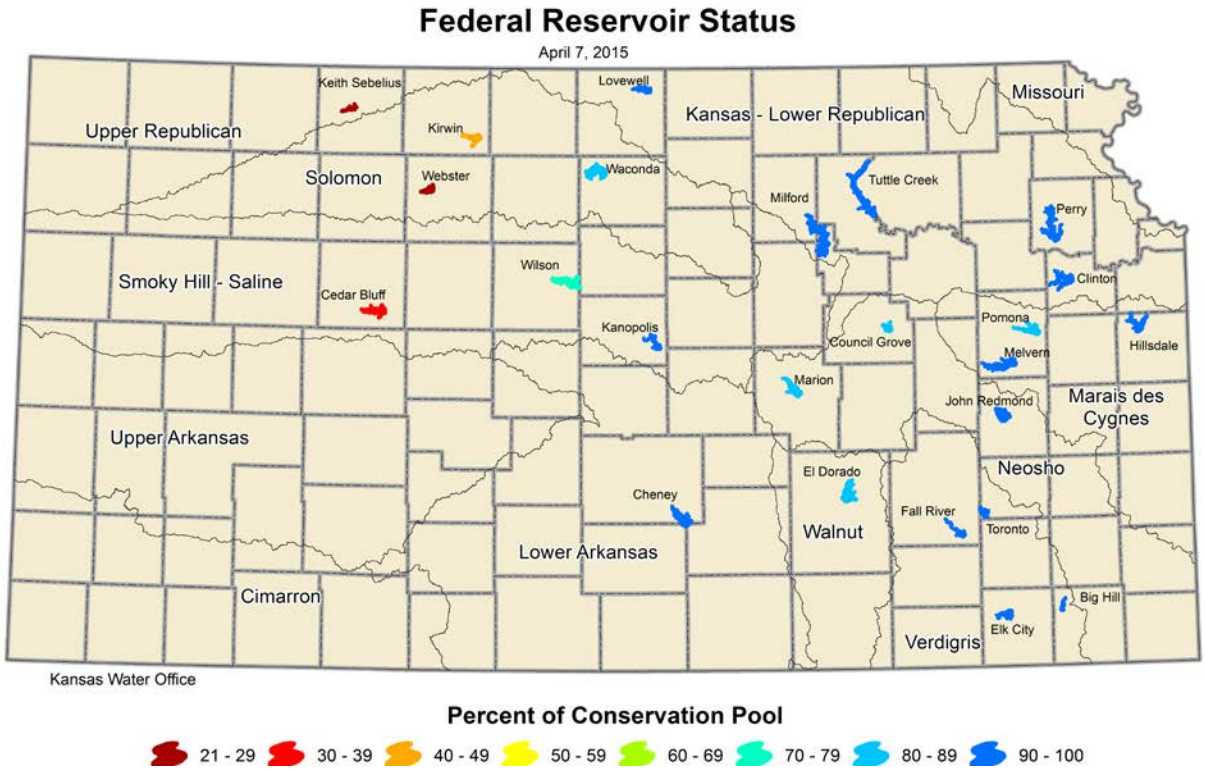
Marais des Cygnes basin: Pomona, Melvern, and Hillsdale reservoirs received very little inflow during the month of March and all three experienced some decline. The deficit in storage at Pomona and Melvern is due to lack of inflow but Hillsdale is below top of conservation storage due to an intentional winter drawdown. Minimum releases were sufficient to meet demands and maintain stream flow of the Marias des Cygnes River. The lower Marais des Cygnes ran well above low flow targets during the month.

Cottonwood / Neosho basin: Stream flow in the Cottonwood and lower Neosho rivers was sufficient to meet demands and in-stream needs but Council Grove Reservoir releases were necessary to support demands in the upper Neosho. Storage in Council Grove and Marion reservoirs experienced minimal declines. John Redmond Reservoir conservation storage was full all month.

Verdigris basin: All reservoirs received inflow and remained at or above normal pool level. Supplemental releases were not necessary to meet target flows.

Smoky Hill basin: The Smoky Hill basin remains dry. Kanopolis Reservoir had very little inflow but the pool remained above conservation elevation, discharging through the uncontrolled notch. Downstream flow stayed below the historical median but was sufficient and above the low flow target at Mentor.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

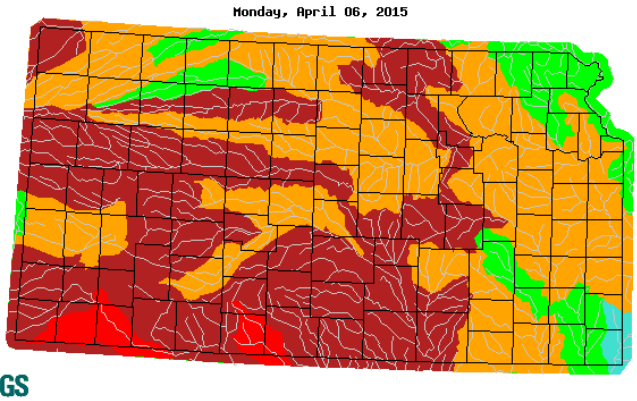
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**04/07/2015**		
Norton[1]	2304.3	2288.31	-15.99	28.9
Harlan County, NE	1945.73	1934.14	-11.59	57.2
Lovewell[1]	1582.6	1583.26	0.66	100.0
Milford[1]	1144.4	1143.01	-1.39	94.4
Cedar Bluff	2144	2120.74	-23.26	34.9
Kanopolis[1]	1463	1463.92	0.92	100.0
Wilson[1]	1516	1507.48	-8.52	71.2
Webster[1]	1892.5	1870.97	-21.48	24.8
Kirwin[1]	1729.3	1715.72	-13.53	44.0
Waconda[1]	1455.6	1453.34	-2.26	87.6
Tuttle Creek[1]	1075	1072.55	-2.45	90.1
Perry[1]	891.5	890.11	-1.39	93.0
Clinton[1]	875.5	874.45	-1.05	93.8
Melvern[1]	1036	1033.85	-2.15	90.5
Pomona[1]	974	971.76	-2.24	84.9
Hillsdale[1]	917	915.84	-1.16	92.9
Arkansas River Basin		**04/07/2015**		
Cheney	1421.6	1420.18	-1.42	92.0
El Dorado	1339	1336.20	-2.80	87.0
Toronto[1]	901.5	901.65	0.15	100.0
Fall River[1]	948.5	948.56	0.06	100.0
Elk City[1]	796	796.30	0.30	100.0
Big Hill	858	857.91	-0.09	100.0
Council Grove[1]	1274	1271.04	-2.96	82.0
Marion[1]	1350.5	1348.69	-1.81	86.0
John Redmond[1]	1039	1041.01	0.01	100.0

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

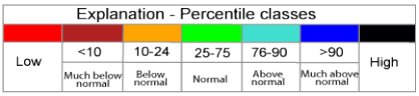
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

Streamflow Conditions

The comparison of present 7-day streamflow to historical is shown on the map below left.



In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



USGS

Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

A total of 207 water right files are under administration on the streams as indicated in the table below.

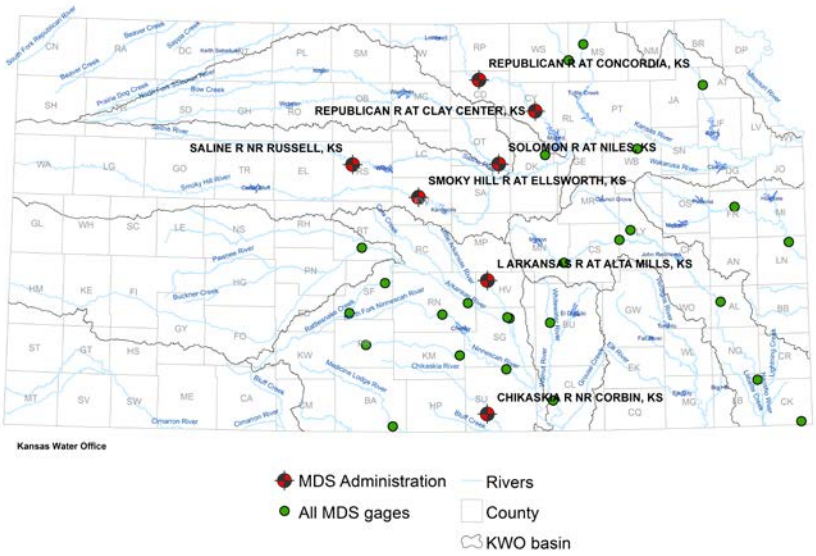
Streamflows in cubic feet per second (cfs)									
Gaging Station	**Flow March 5**	**Flow March 12**	**Flow March 18**	**Flow March 26**	**Flow April 2**	**March MDS**	**April MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	69	71	64	69	61	150	150	**03/20/15**	**70**
Republican River at Clay Center	Ice	106	91	90	121	200	250	**03/20/15**	**136**
Smoky Hill River at Ellsworth	20	22	20	21	20	25	30	**03/23/15**	**3**
Saline River near Russell	3	3	2	2	1	15	15	10/22/2014	8
Solomon River at Niles	*	49	51	43	40	60	60	**03/23/15**	**36**
Chapman Creek near Chapman	16	16	15	14	14	15	15		
Mill Creek near Paxico	*	*	*	*	13	8	25		
Little Arkansas at Alta Mills	7	8	6	6	5	8	8	01/16/2015	10
Whitewater River near Towanda	15	18	13	24	17	15	20		
Walnut River at Winfield	*	*	*	*	50	40	65		
Medicine Lodge River near Kiowa	62	60	56	58	54	60	60		
Chikaskia River near Corbin	ice	50	47	60	44	50	45	02/23/2015	7
									*Not applicable

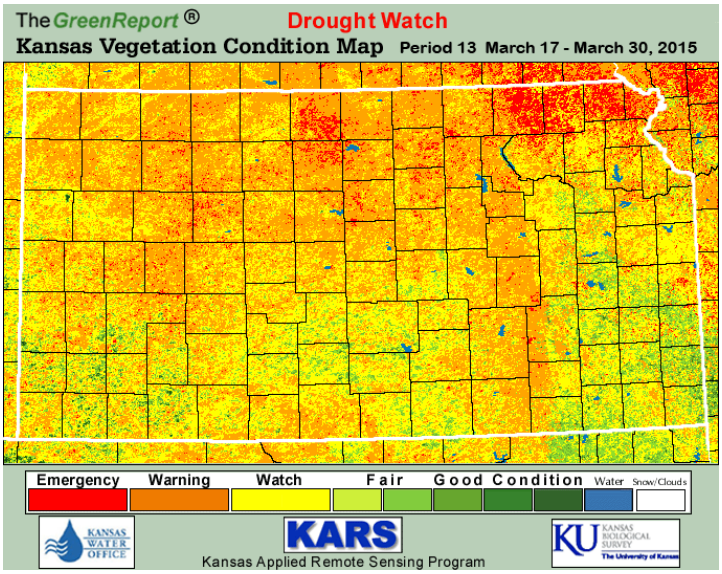
Soil, Crop and Vegetation

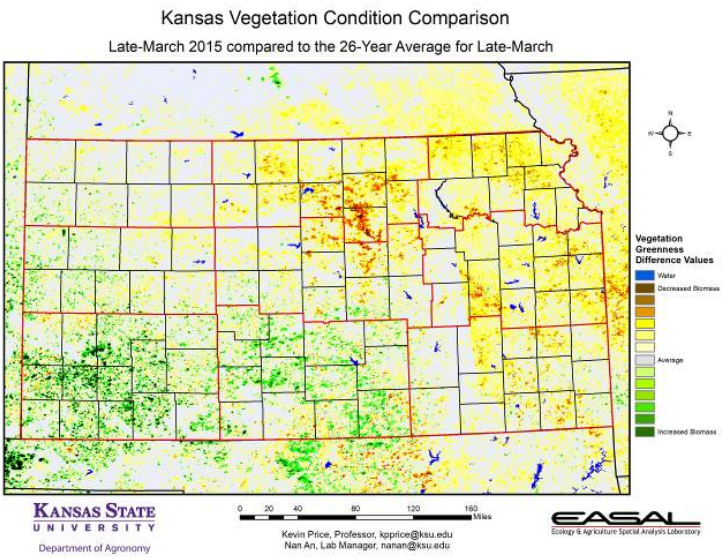
Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. All looks normal for this time of year. Some improvement was shown the last week of March in the south central wheat growing areas and the eastern part of the state. The northern areas remain dry. The K-State Vegetative Condition Comparison to historical data is also provided below.

Kansas Minimum Desirable Streamflow (MDS) Gages Administration
April 2, 2015



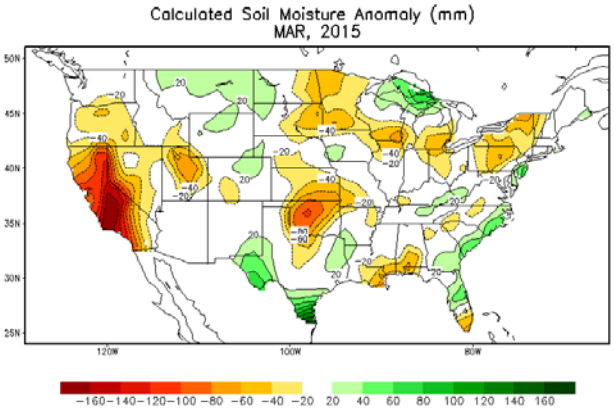




Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for March 17 – 30 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the northeastern division has been the slowest to emerge from dormancy. This area of the state has had cooler temperatures than other parts of the state. In north central, Kansas the combination of drought conditions and extreme temperatures have resulted in very low biomass production. In southwest Kansas, the winter moisture has been close to average with slightly warmer than normal temperatures. This has accelerated photosynthetic activity in this region.

Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml



Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report released March 30, 2015 for the week ending March 29, 2015 reported topsoil moisture rated 16 percent very short, 37 short, 46 adequate, and 1 surplus. Subsoil moisture rated 19 percent very short, 42 short, 39 adequate and 0 surplus.

Field Crops: Winter wheat condition rated 4 percent very poor, 13 poor, 44 fair, 35 good, and 4 excellent. Winter wheat jointing was at 15 percent, ahead of 5 last year, but behind 18 average.

Livestock: Cattle and calf conditions rated 1 percent very poor, 2 poor, 31 fair, 60 good, and 6 excellent. Cattle and calf death loss rated 0 percent heavy, 72 average, and 28 light.

Sheep and lamb conditions rated 0 percent very poor, 0 poor, 29 fair, 65 good, and 6 excellent. Sheep and lamb death loss rated 0 percent heavy, 63 average, and 37 light.

Hay and roughage supplies rated 2 percent very short, 10 short, 84 adequate, and 4 surplus.

Stock water supplies rated 14 percent very short, 26 short, 60 adequate, and 0 surplus.
http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.

Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

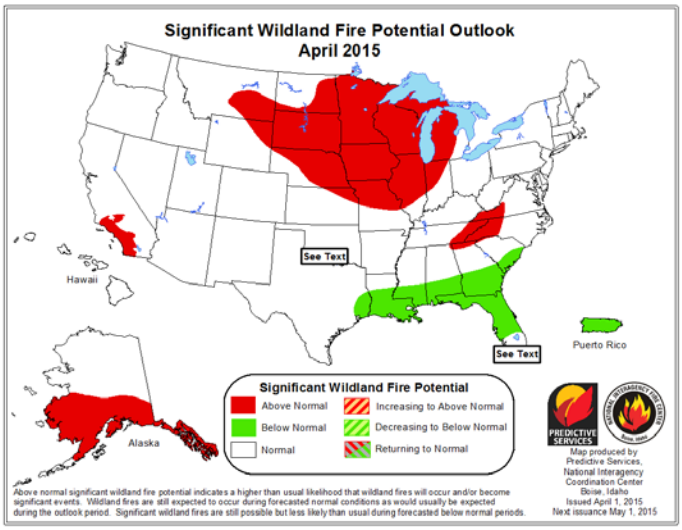
The provisions remain in effect until the drought declaration is terminated.

Burn Bans and Fires

Due to condition March saw many days unsuitable for burning, when NOAA issued elevated or other fire weather outlooks.

According to the Kansas Adjutant General, on April 3, 2015, burn bans were in effect for the following counties: Brown, Clark, Crawford, Edwards, Ellis, Ellsworth, Franklin, Graham, Jefferson, Kearny, Lane, Lincoln, Linn, Ness, Norton, Ottawa, Philips, Rooks, Rush, Russell, Sherman, Smith, Stanton, and Trego counties. (http://www.kansastag.gov/press_release_detail.asp?PRid=1031)

In addition County Burn Permit System was in place for the following counties: Allen, Anderson, Barton, Butler, Cheyenne, Clay, Cowley, Dickinson (permits issued by township, no permits currently being issued), Franklin, Geary, Gove, Hamilton, Jewell, Kingman, Kiowa, Leavenworth, Logan, Marion, Marshall, McPherson, Osage, Ottawa, Pottawatomie, Riley, Russell, Saline, Sedgwick, Seward, Stafford, Stanton, Wabaunsee, and Wyandotte counties. City Burn Permits Systems were in place for Bonner Springs and Edwardsville (no permits being issued).



The decision to implement a burn ban is made by county or city government leadership based on local conditions, To determine if your area has burning restrictions contact you county emergency management office or your local fire department or law enforcement dispatch center.

The Predictive Services section at the National Interagency Fire Center's Wildland Fire provides monthly fire hazard predictions. http://www.predictiveservices.nifc.gov/outlooks/outlooks.htm

General Federal Disaster Assistance
USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's Natural Resources Conservation Service (NRCS) administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock
The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators.

LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A
Known Conservation Stages
March 31, 2015

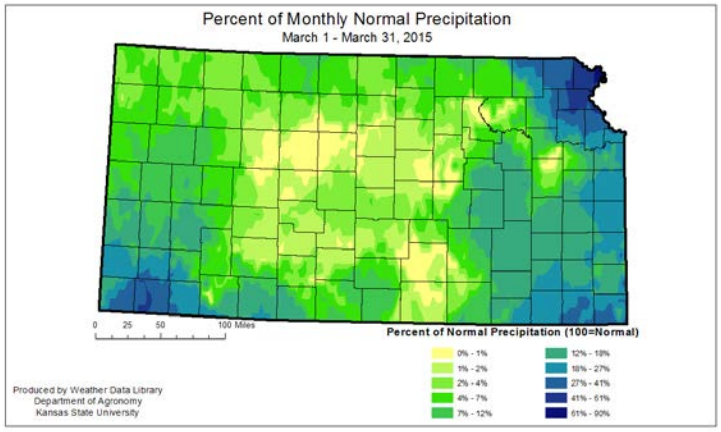
Public Water Supply	County	Conservation Stage	2014 Stage[1]	Comment[2]
Ellis	Ellis	Water Emergency	3	
McCracken	Rush	Water Emergency	3	July 3, 2013/Dec. 22, 2013
Medicine Lodge	Barber	Water Emergency	3	July 1, 2013
Russell	Russell	Water Emergency	3	Stage 4 equivalent to other Stage 3
Victoria	Ellis	Water Emergency	3	March 1, 2014, Warning April 15, 2013
Ellsworth	Ellsworth	Water Warning	2	1/6/14 chg stage 3 to 2
Scott City	Wichita	Water Warning	2	May 2014
Abilene	Dickinson	Water Warning	1	Stage 2- 7/25/13, Stage 3 –level 1, 4/22/13, Stage 2

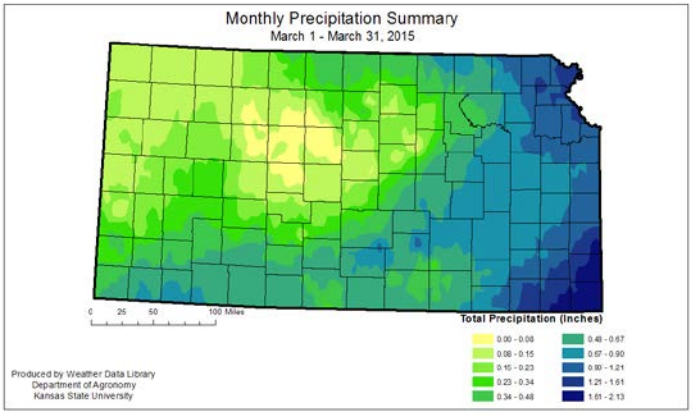
[1] 1 = Water Watch
2 = Water Warning
3 = Water Emergency

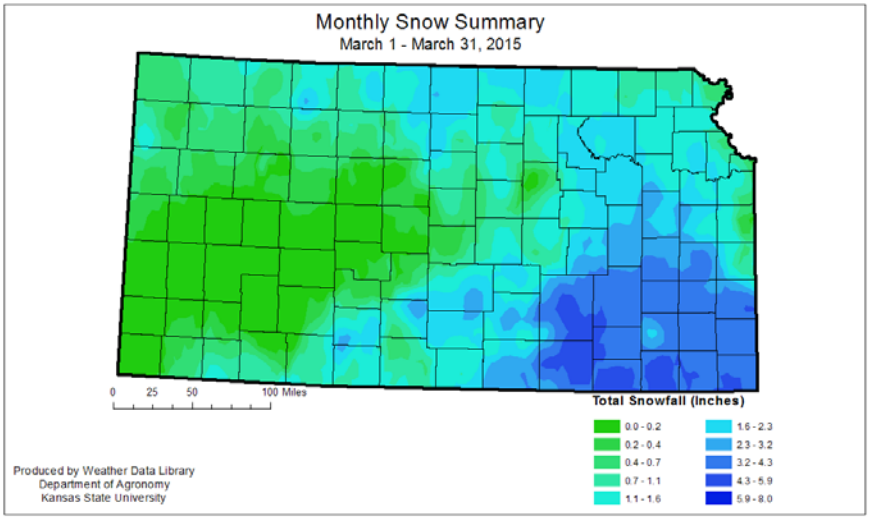
[2] CN Assurance = Cottonwood & Neosho River Water Assurance District
K Assurance = Kansas River Water Assurance District
M Assurance = Marais des Cygnes River Water Assurance District
Marketing = Water Marketing Program

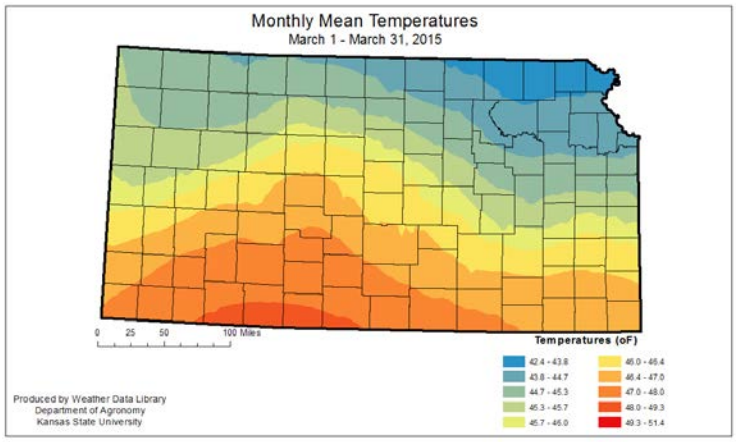
APPENDIX B

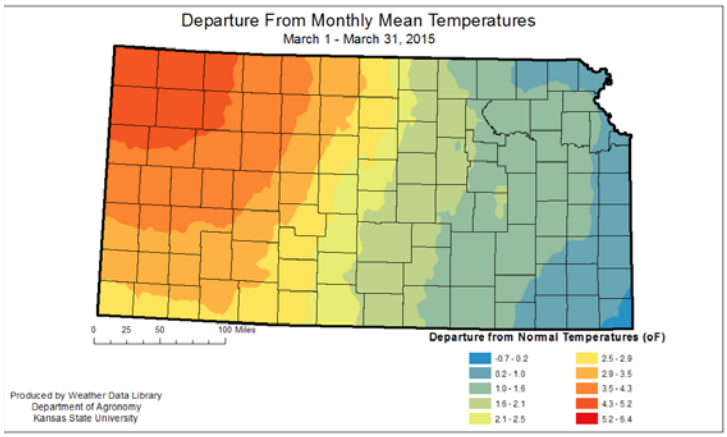
Precipitation, Snowfall and Temperature Maps from Kansas Weather Data Library











Appendix C

March 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	0.32	-0.57		45.3	5.6	87 (16)	12 (5)
Dodge City	0.29	-1.30		48.6	4.2	91 (16)	16 (5)
Garden City	0.32	-1.14		46.7	3.1	91 (16)	12 (5)
Goodland	0.11	-0.96		46.5	6.0	89 (16)	13 (5)
Guymon, OK	1.01	-0.42		50.2	3.9	88 (16)	15 (5)
Hill City	0.06	-1.57		47.0	5.2	94 (16)	3 (5)
Lamar, CO	0.19	-0.65		46.3	3.8	89 (16)	11 (5)
McCook, NE	0.03	-1.33		47.5	8.1	93 (16)	7 (5)
Springfield, CO	0.38	-0.75		45.1	2.3	82 (16)	4 (5)
Central							
Concordia	0.11	-1.90		47.2	4.2	89 (16)	5 (5)
Hebron, NE				44.7	4.6	90 (16)	3 (5)
Medicine Lodge	0.38	-1.88		49.9	3.2	88 (16)	10 (5)
Ponca City, OK	0.26	-2.45		50.9	2.1	86 (31)	7 (5)
Salina	0.05	-2.34		48.2	2.8	88 (16)	13 (5)
Wichita (ICT)	0.28	-2.41		49.5	3.0	84 (16)	10 (5)
East							
Bartlesville, OK	1.38	-2.10		49.4	0.6	83 (31, 24)	9 (5)
Chanute	0.55	-2.49		48.8	1.7	82 (16)	14 (5)
Fall City, NE	0.80	-1.54		45.1	3.2	87 (16)	3 (5)
Johnson Co. Exec. Apt	0.86	-1.77		47.5	2.6	81 (16)	11 (5)
Joplin, MO	1.83	-1.59		49.0	0.1	79 (24)	13 (5)
Kansas City (MCI), MO	0.88	-1.49		46.7	2.5	83 (16)	6 (5)
St. Joseph, MO	1.33	-0.92		44.8	1.9	85 (16)	3 (5)
Topeka (TOP	0.77	-1.72		46.9	2.1	85 (16)	10 (5)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS DROUGHT UPDATE –April 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General – Drought

- Executive Order 14-04 issued by Governor Brownback May 21, 2014, remains in effect. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.
- The US Drought Monitor indicated dry conditions persist across 92 percent of Kansas at the end of April. Moderate drought (D1) or worse was affecting 68 percent of the state.
- USDA declared 29 Kansas Counties Primary Disaster areas for 2015 due to drought. An additional 14 contiguous counties are also eligible federal for assistance.

Water Supply

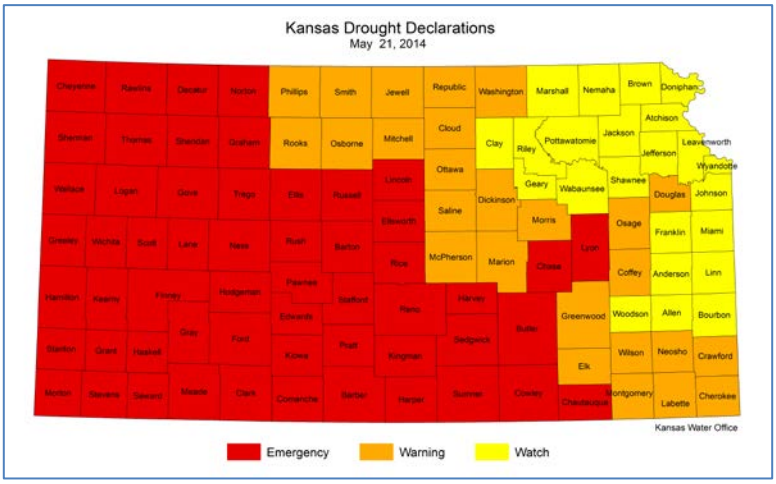
- Some supplies remain in Conservation Plan Stage 3 – Water Emergency: Ellis, McCracken, Medicine Lodge, Russell and Victoria.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration is in effect on 6 rivers or creeks due to low flows at 7 gage locations.

Kansas County Drought Declarations: Executive Order 14-04 was issued by Governor Brownback May 21, 2014, modifying drought declarations for Kansas counties. Drought stages are in effect for all 105 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use. Crop and pasture conditions also play a role in declaration determination. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.

Drought Emergency:
Barber, Barton, Butler, Chase, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Lane, Lincoln, Logan, Lyon, Meade, Morton, Ness, Norton, Pawnee, Pratt, Rawlins, Reno, Rice, Rush, Russell, Scott, Sedgwick, Seward, Sheridan, Sherman, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wallace, Wichita.

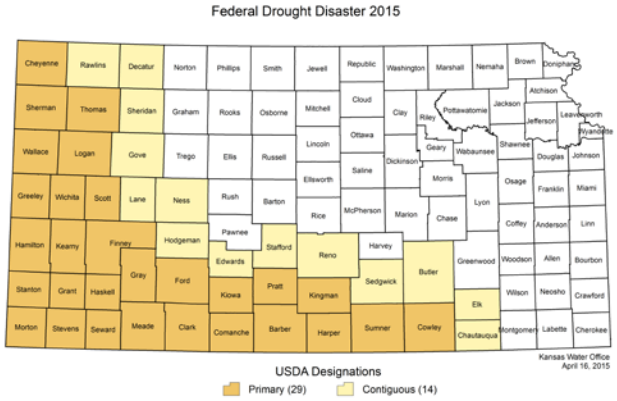


Drought Warning: Cherokee, Cloud, Coffey, Crawford, Dickinson, Douglas, Elk, Greenwood, Jewell, Labette, Marion, McPherson, Mitchell, Montgomery, Morris, Neosho, Osage, Osborne, Ottawa, Phillips, Rooks, Republic, Saline, Smith, Washington, Wilson.

Drought Watch: Allen, Anderson, Atchison, Bourbon, Brown, Clay, Doniphan, Franklin, Geary, Jackson, Jefferson, Johnson, Leavenworth, Linn, Marshall, Miami, Nemaha, Pottawatomie, Riley, Shawnee, Wabaunsee, Woodson, Wyandotte.

Federal: USDA has designated 29Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 14contiguous counties are also eligible for natural disaster assistance. These are Butler, Chautauqua, Decatur, Edwards, Elk, Gove, Hodgeman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford and Sumner.



Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

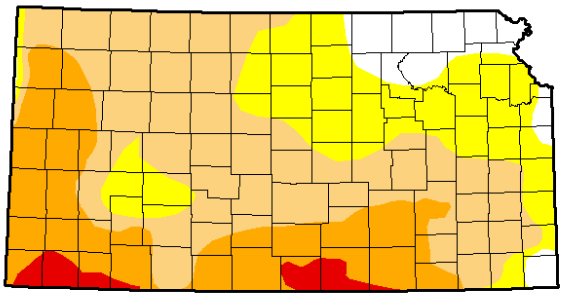
Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

General Conditions

Drought conditions persist across the state, particularly in the west. There was widespread degradation in the western portions of the state, but the drought-free portion of the state expanded in the Northeast and slightly in the Southeast.

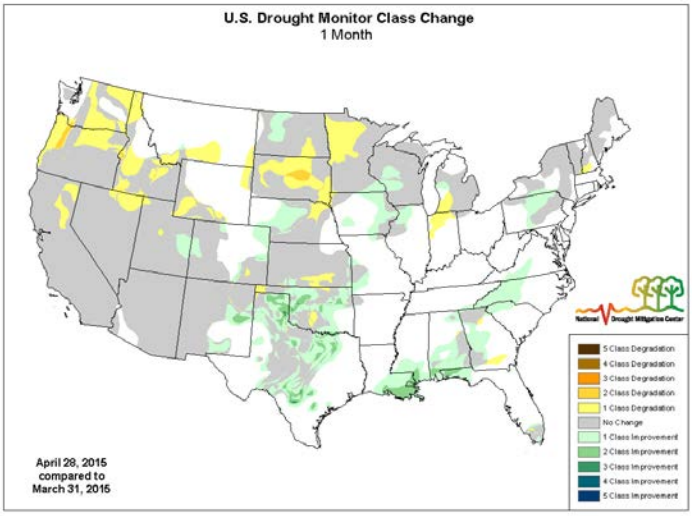
More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

While an El Niño/Southern Oscillation (ENSO) continues it is weak and the impacts are uncertain. El Niño conditions favor milder and wetter than normal conditions in Kansas during the winter but it is not the only global circulation pattern than can produce those conditions. When an El Niño is present there is an increased likelihood of wetter than normal conditions in the Central Plains.



	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	8.01	91.99	67.89	26.18	3.17	0.00
Last Week 4/21/2015	8.01	91.99	67.89	27.56	4.04	0.00
3 Months Ago 1/27/2015	0.46	99.54	37.66	18.58	1.88	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 4/29/2014	0.00	100.00	98.84	72.06	24.68	0.00

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

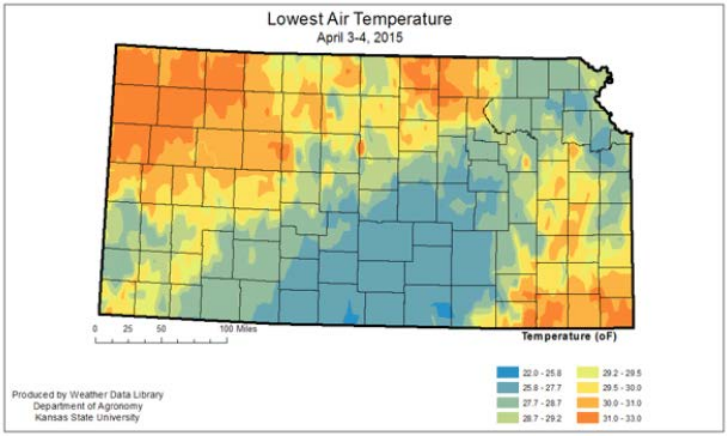


http://droughtmonitor.unl.edu

The next table provides climate division moisture needs to end drought.

Climate Division	Precipitation needed to End Drought (inches)			
	Week ending April 4	Week ending April 11	Week ending April 18	Week ending April 25
Northwest	5.18	5.75	4.08	3.87
West Central	1.90	2.52	0.96	-
Southwest	-	1.17	1.08	1.21
North Central	3.72	4.18	3.65	1.89
Central	1.57	2.00	-	-
South Central	1.69	1.93	-	-
Northeast	-	0.80	-	-
East Central	0.87	1.31	-	-
Southeast	0.97	1.22	-	-

Climate Summary (Temperature and Precipitation)

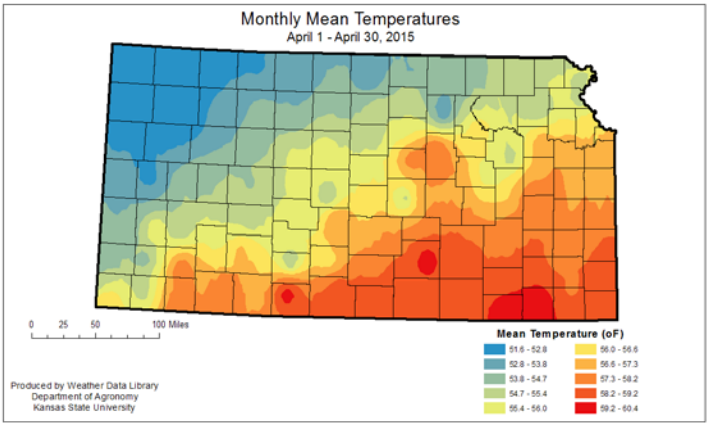


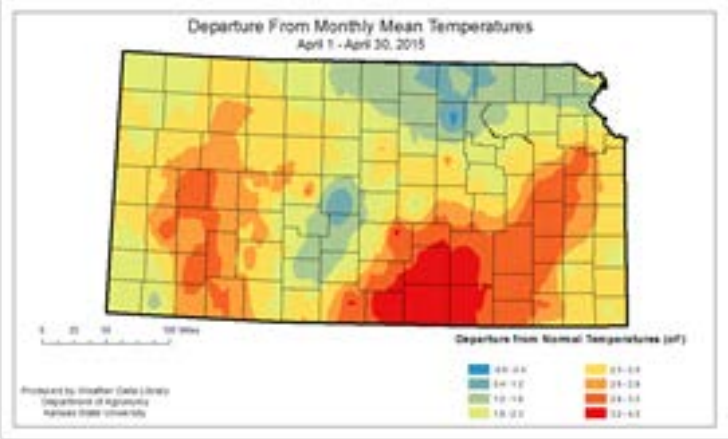
April temperatures ranged from 20 ^{o}F on April 5th at Wilmore 16SE (Comanche County) to 96 ^{o}F at Great Bend (Barton County) on the 7th. The widespread low temperatures on the 4th and 5th of April had a negative impact on winter wheat. The largest area of the coldest temperatures coincided with wheat that was at the most vulnerable stages. Overall, the temperatures averaged 55.7 ^{o}F, which was 2.4 degrees warmer than normal. It ranks as 34th warmest since 1895 or in the warmest third of the period of record. The warmest departures from average were in the South Central Division, while the coolest conditions prevailed in the Northeastern Division. With the warmer than average temperatures for the month, it is not surprising that 25 new record daily highs were set.

The table below summarizes temperatures by Kansas climate division and various time periods. Please note the data used in compiling is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

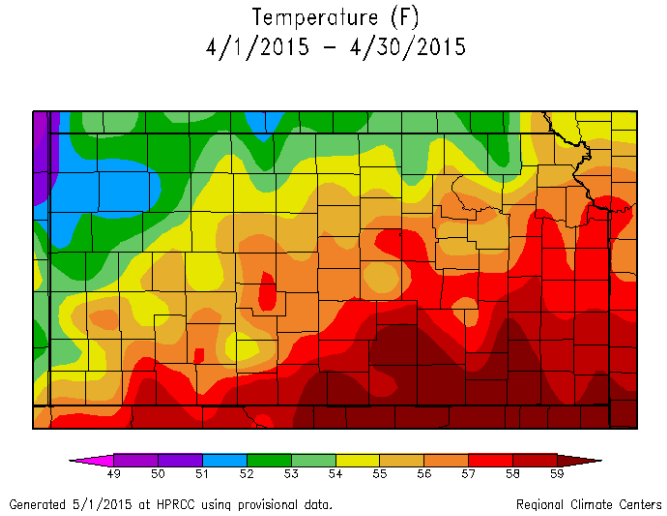
	Kansas Climate Division Temperature Summary (^{o}F)							
	April 2015							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	67.1	37.4	52.2	2.4	88	2	26	10
West Central	69.2	37.7	53.4	2.6	91	7	22	10
Southwest	71.6	40.3	56.0	2.4	92	7	22	4
North Central	67.2	41.5	54.3	1.6	91	7	28	4
Central	69.3	43.0	56.1	2.2	92	7	25	4
South Central	71.4	45.1	58.3	3.0	92	7	20	4
Northeast	67.5	43.7	55.6	2.1	87	8	24	4
East Central	68.3	45.0	56.7	2.5	88	8	25	4
Southeast	69.4	47.6	58.5	2.7	90	8	22	4
STATE	69.0	42.4	55.7	2.4	92	7th	20	4th
Data Source: KSU Weather Library								

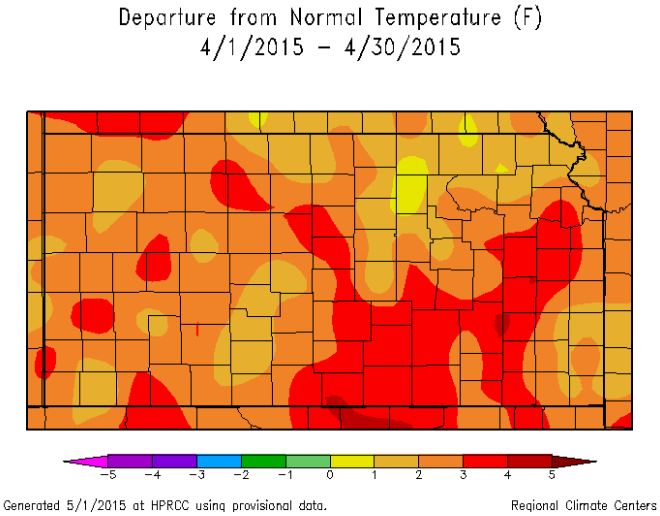
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





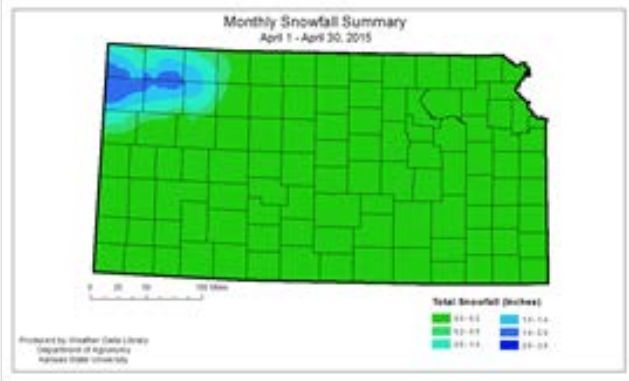
Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.





State-wide average precipitation was 2.55 inches which was 95 percent of normal. That means the deficit averages just -0.08 inches. Still, the distribution was highly variable. The Southwest Division had the lowest percent of normal at 60 percent or 1.06 inches. This left a deficit of -0.62 inches.

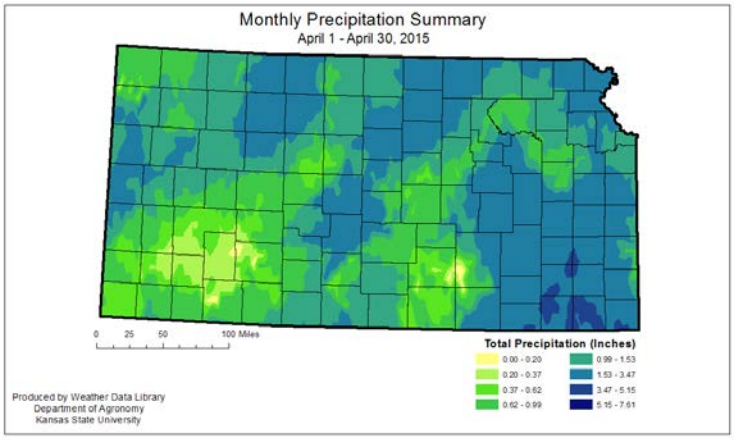
Even within the division amounts were highly variable. Ashland (Clark County) reported 3.34 inches while the Garden City Experiment Station (Finney County) reported just 0.25 inches. State-wide, the wettest day of the month was on the 17th, when the average reported precipitation was 0.56 inches, with the highest amount reported that day 4.62 inches. However, the highest daily total reported for the CoCoRaHS network was at Caldwell 8.4 N in Sumner County, on the 19th. The highest 24hr total reported for the month at a National Weather Service Coop site was 3.95 inches at Sharon Springs, Wallace County, on the 17th. Highest monthly total for the National Weather Service was 7.61 inches at Hudson, Stafford County. The greatest monthly total for the CoCoRaHS network 7.36 inches at Buffalo 0.1 NW, Wilson County.

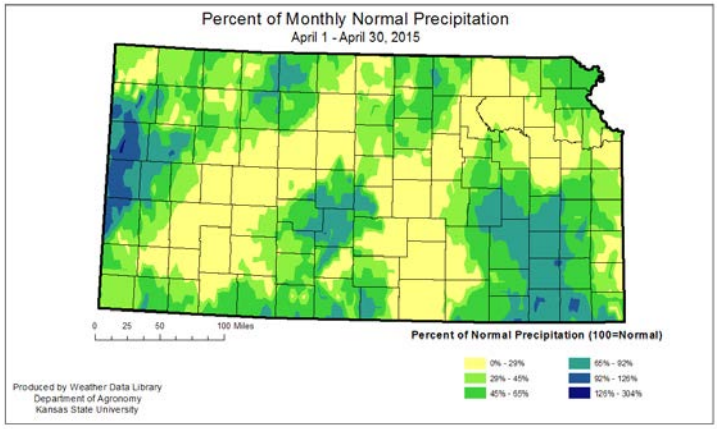


Snowfall was concentrated at the beginning of the month, with the highest totals reported in the Northwestern Division. Greatest monthly totals were 2.7 inches at Goodland 0.5 ENE, Sherman County (CoCoRaHS) and 3.6 inches at Colby 1SW, Thomas County (NWS).

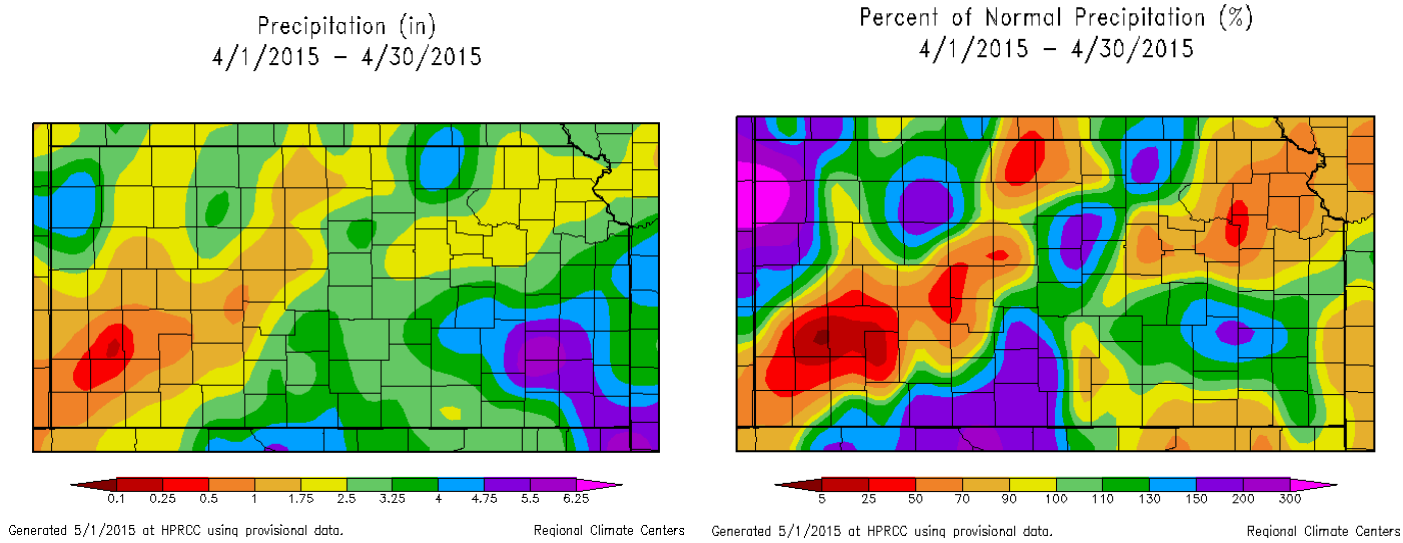
Kansas Climate Division Precipitation Summary (inches) Summary March 2015												
Climate Division	April 1-30, 2015			January 1 – April 30, 2015			April 1 - April 30, 2015			September 1 – April 30, 2015		
	Actual	Depart [1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	2.10	0.03	102	2.66	-1.71	61	2.10	0.03	102	5.76	-3.09	66
West Central	1.93	0.02	103	2.81	-1.60	64	1.93	0.02	103	6.79	-2.09	76
Southwest	1.02	-0.62	60	2.84	-1.18	70	1.02	-0.62	60	7.75	-0.74	90
North Central	2.53	0.01	97	3.86	-2.13	62	2.53	0.01	97	9.28	-3.43	70
Central	2.31	-0.35	86	3.80	-2.81	56	2.31	-0.35	86	11.76	-1.66	87
South Central	3.83	1.13	144	5.47	-1.85	76	3.83	1.13	144	11.15	-4.02	74
Northeast	2.53	-0.72	80	4.73	-2.73	63	2.53	-0.72	80	14.06	-2.73	83
East Central	2.85	-0.71	79	5.00	-3.48	58	2.85	-0.71	79	15.19	-3.60	79
Southeast	4.00	0.13	103	6.04	-3.83	61	4.00	0.13	103	18.66	-3.30	83
STATE	2.59	-0.08	95	4.17	-2.34	64	2.59	-0.08	95	11.18	-2.72	79

Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





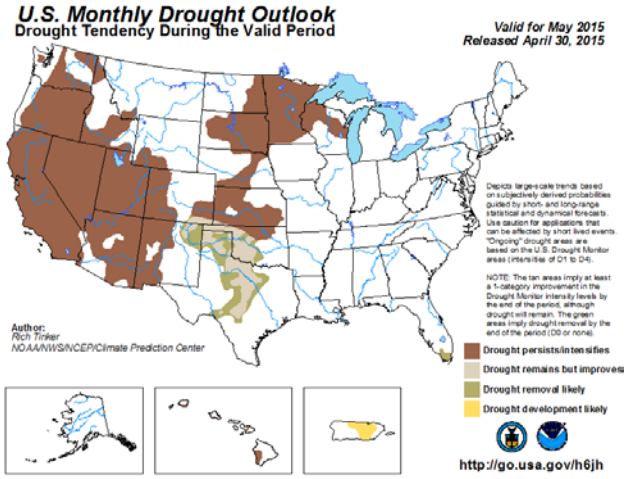
Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

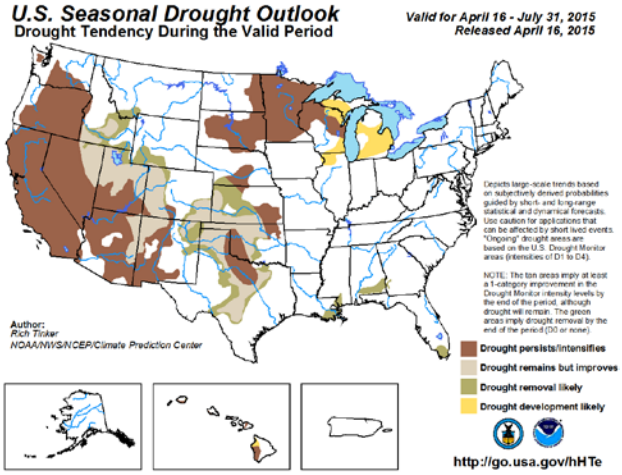


The severe weather season was more active in April than in March. There were 29 tornadoes reported in April. Damaging wind reports totaled 71, while hail reports numbered 128. One of the most active days of the month occurred on the 24th, when multiple tornadoes, with high winds and hail occurred. As part of that outbreak hail of 1.5 inches was reported in Lucas, KS. Most cars and roofs in the town sustained significant damage.

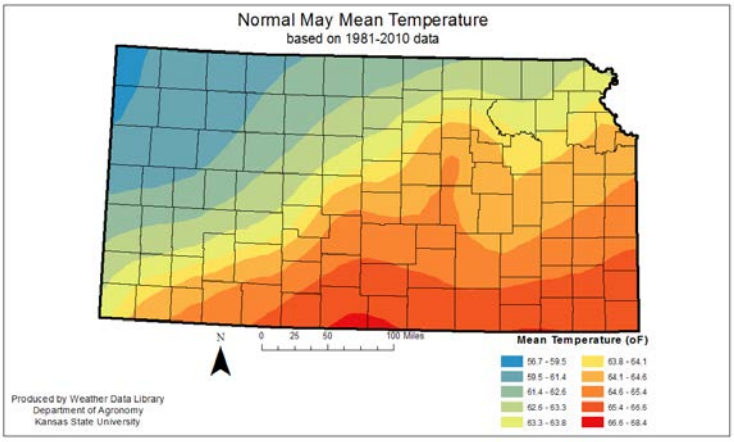
Future Outlook

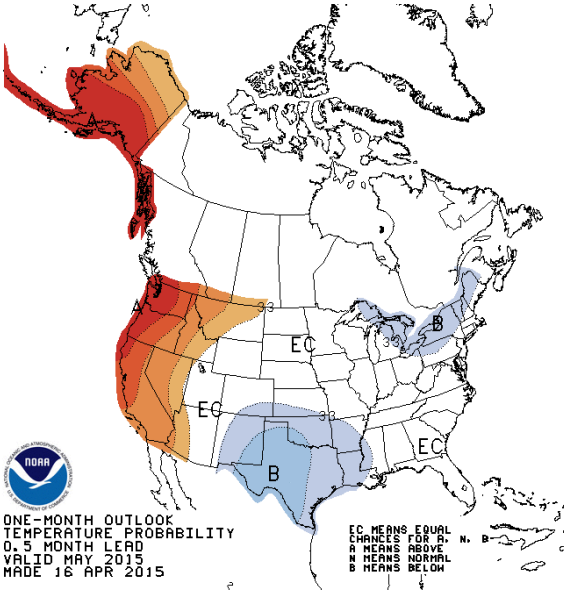
The May temperature outlook calls for greater chances of normal temperatures for most of the state. The precipitation outlook is for wetter than normal conditions state-wide. This does not indicate how that moisture might be distributed. If the outlook materializes, drought conditions are likely to improve over parts of the state during the next month.

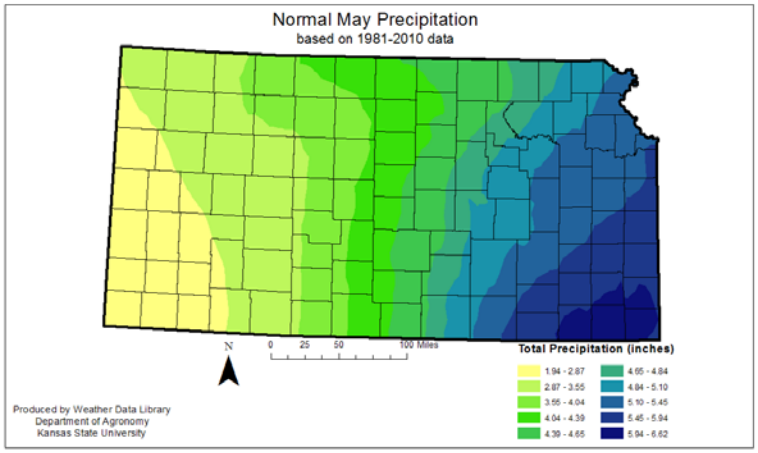


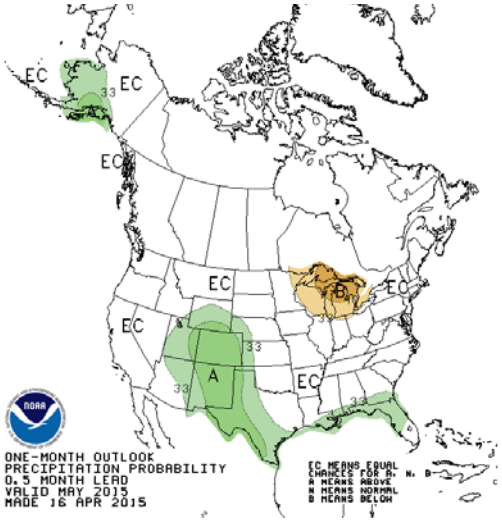


May outlook and normal Kansas April temperatures and precipitation are compared below. Temperatures are equally likely to be above, normal, normal or below normal for April. Precipitation is more likely to be below normal.

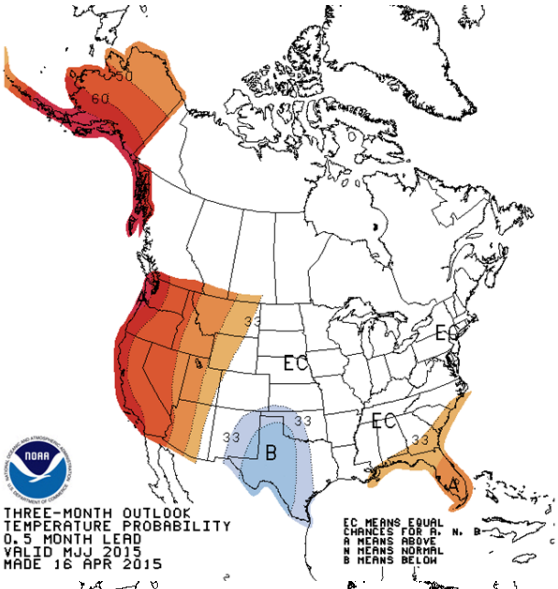


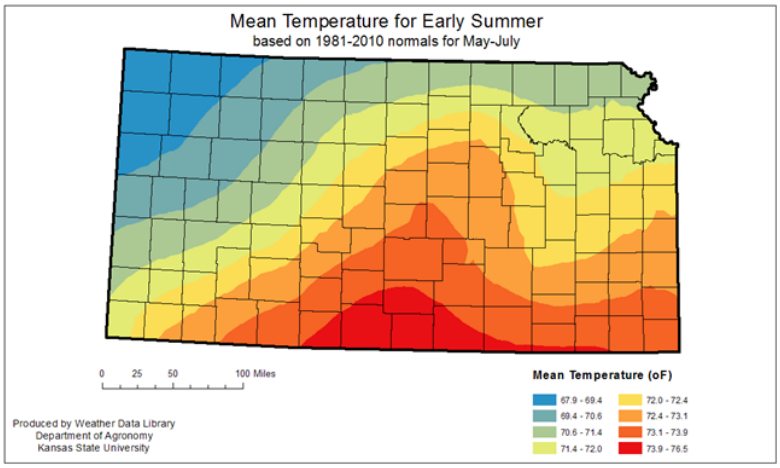


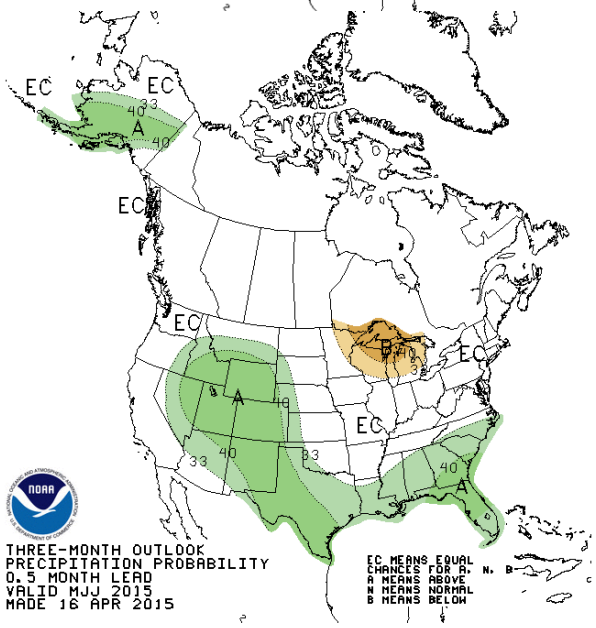


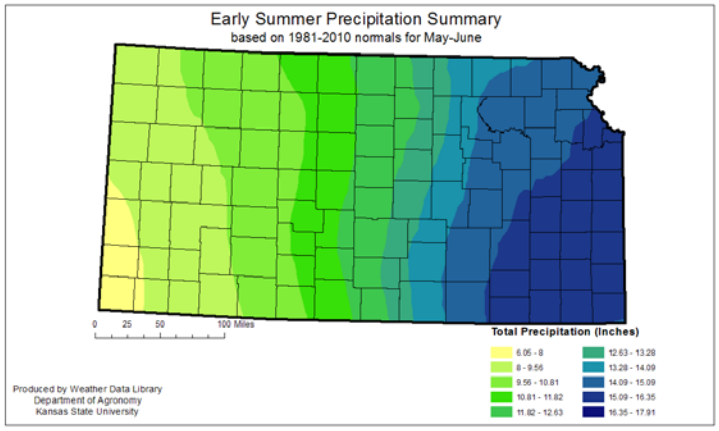


The three-month outlook for temperatures and precipitation favor equal chances of below normal, normal or above normal for May through July.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

The most current list of public water suppliers known or required to be in conservation are included in Appendix A. As there are no reporting requirements for reporting water supply stages this list is based on the best information available.

Surface Water Supply Conditions

Kansas River basin: Inflow to Perry, Milford, and Tuttle Creek reservoirs was sufficient to maintain collective releases above minimum discharge and support Kansas River target flows but was relatively low for April, especially for Tuttle Creek. Clinton Reservoir received little inflow but maintained storage over the month. Precipitation on April 25 did result in a runoff event that provided a moderate boost to system flow and some additional storage, primarily in Tuttle Creek and Milford reservoirs.

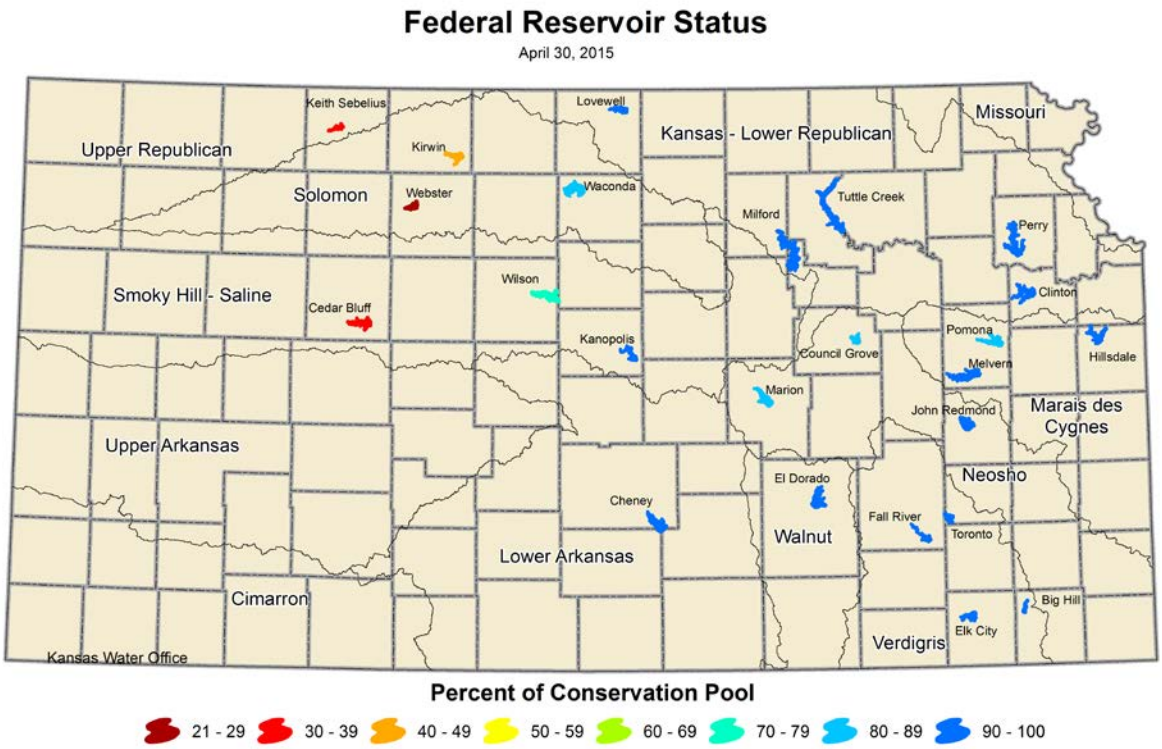
Marais des Cygnes basin: Pomona and Melvern reservoirs received very little inflow during the month of April. Hillsdale Reservoir benefited from a mid-April runoff event and recovered to near normal pool. Minimum releases were sufficient to meet demands and maintain stream flow of the Marias des Cygnes River. The lower Marais des Cygnes ran well above low flow targets during the month.

Cottonwood / Neosho basin: Stream flow in the Cottonwood and lower Neosho rivers was sufficient to meet demands and in-stream needs but Council Grove Reservoir releases were necessary to support demands in the upper Neosho for the first half of the month. Rain provided sufficient stream flow for the second half of the month but Council Grove and Marion did not receive any significant inflow. John Redmond Reservoir conservation storage was full all month.

Verdigris basin: All reservoirs received inflow and remained at or above normal pool level. Supplemental releases were not necessary to meet target flows.

Smoky Hill basin: The Smoky Hill basin remains dry. Kanopolis Reservoir had very little inflow but the pool remained above conservation elevation, discharging through the uncontrolled notch. Downstream flow stayed below the historical median but was sufficient and above the low flow target at Mentor.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

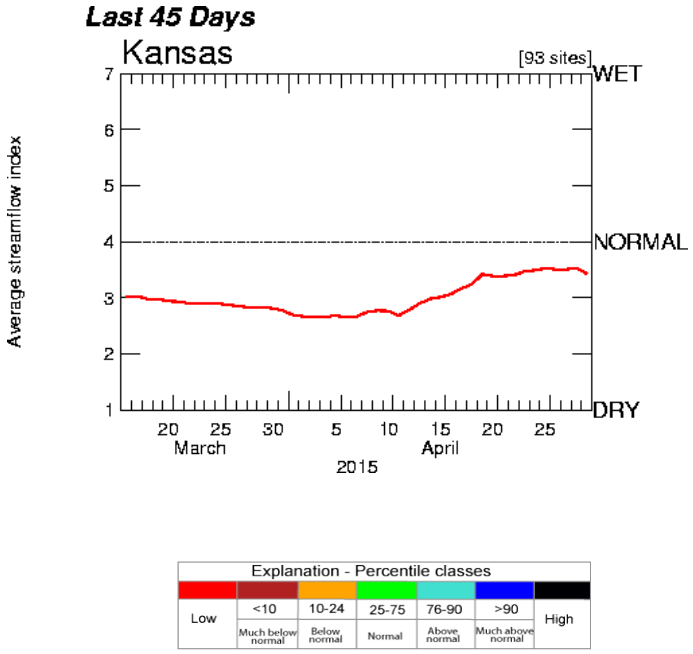
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**04/30/2015**		
Norton[1]	2304.3	2288.52	-15.78	29.5
Harlan County, NE	1945.73	1934.85	-10.88	59.5
Lovewell[1]	1582.6	1583.88	1.28	100.0
Milford[1]	1144.4	1143.71	-0.69	97.2
Cedar Bluff	2144	2120.82	-23.18	35.1
Kanopolis[1]	1463	1463.96	0.96	100.0
Wilson[1]	1516	1507.41	-8.59	71.0
Webster[1]	1892.5	1871.20	-21.25	25.3
Kirwin[1]	1729.3	1715.87	-13.38	44.5
Waconda[1]	1455.6	1453.33	-2.27	87.5
Tuttle Creek[1]	1075	1074.34	-0.66	97.2
Perry[1]	891.5	890.48	-1.02	94.9
Clinton[1]	875.5	874.57	-0.93	94.5
Melvern[1]	1036	1034.12	-1.88	91.6
Pomona[1]	974	971.86	-2.14	85.5
Hillsdale[1]	917	916.86	-0.14	99.1
Arkansas River Basin		**04/30/2015**		
Cheney	1421.6	1420.40	-1.20	93.0
El Dorado	1339	1336.63	-2.37	89.0
Toronto[1]	901.5	901.99	0.49	100.0
Fall River[1]	948.5	949.65	1.15	100.0
Elk City[1]	796	796.29	0.29	100.0
Big Hill	858	858.12	0.12	100.0
Council Grove[1]	1274	1271.05	-2.95	82.0
Marion[1]	1350.5	1348.70	-1.80	87.0
John Redmond[1]	1039	1045.16	4.16	100.0

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

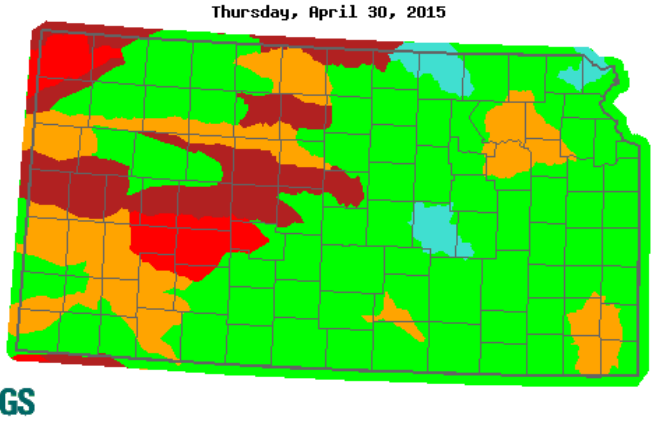
Streamflow Conditions

Kansas streamflows were relatively low throughout most of April, but have improved to near normal in much of eastern Kansas by April 30 as shown in the graph below.



The comparison of present 7-day streamflow to historical is shown on the map below left.

In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



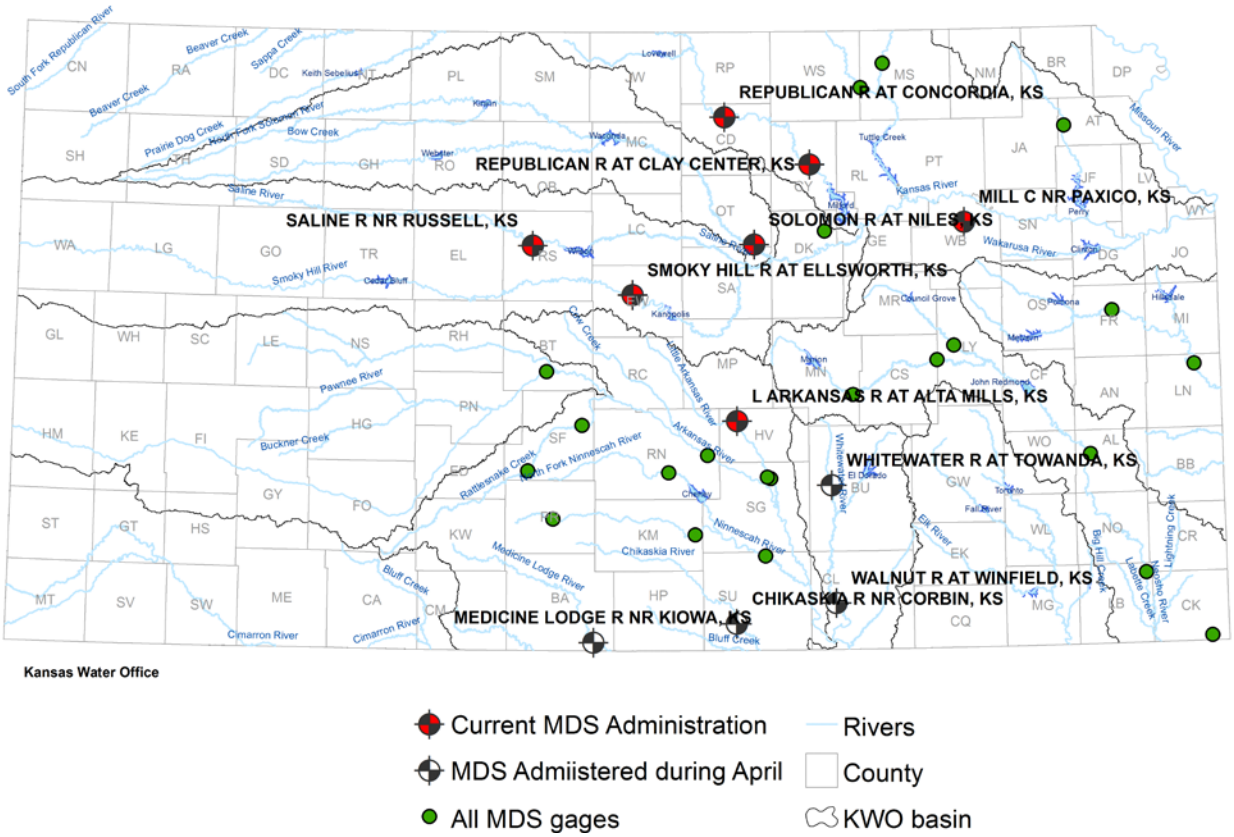
Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

A total of 345 water right files are under administration during April. On April 30, 266 files were being administered on the streams as indicated in the table below. Administration on the Whitewater, Walnut, Medicine Lodge and Chikaskia rivers began and ceased during April.

Streamflows in cubic feet per second (cfs)									
Gaging Station	**Flow April 2**	**Flow April 9**	**Flow April 16**	**Flow April 23**	**Flow April 30**	**April MDS**	**May MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	61	69	59	55	85	150	150	03/20/15	70
Republican River at Clay Center	121	97	106	108	210	250	250	03/20/15	136
Smoky Hill River at Ellsworth	20	20	19	20	21	30	35	03/23/15	3
Saline River near Russell	1	2	2	2	9	15	15	10/22/2014	8
Solomon River at Niles	40	44	47	53	86	60	90	03/23/15	36
Chapman Creek near Chapman	14	14	13	13	14	15	15		
Little Blue River near Barnes	*	146	131	120	252	150	150		
Mill Creek near Paxico	13	13	13	13	17	25	30	04/15/15	13
Little Arkansas at Alta Mills	5	7	11	44	13	8	8	01/16/2015	10
Whitewater River near Towanda	17	9	34	41	28	20	25	4/16/15 ceased 4/29/15	9
Walnut River at Winfield	50	48	258	275	146	65	100	4/16/15 ceased 4/29/15	51
Medicine Lodge River near Kiowa	54	49	81	109	75	60	40	4/14/15 ceased 4/28/15	2
Chikaskia River near Corbin	44	41	122	126	92	45	40	02/23/2015 ceased 4/28/15	7
									*Not applicable

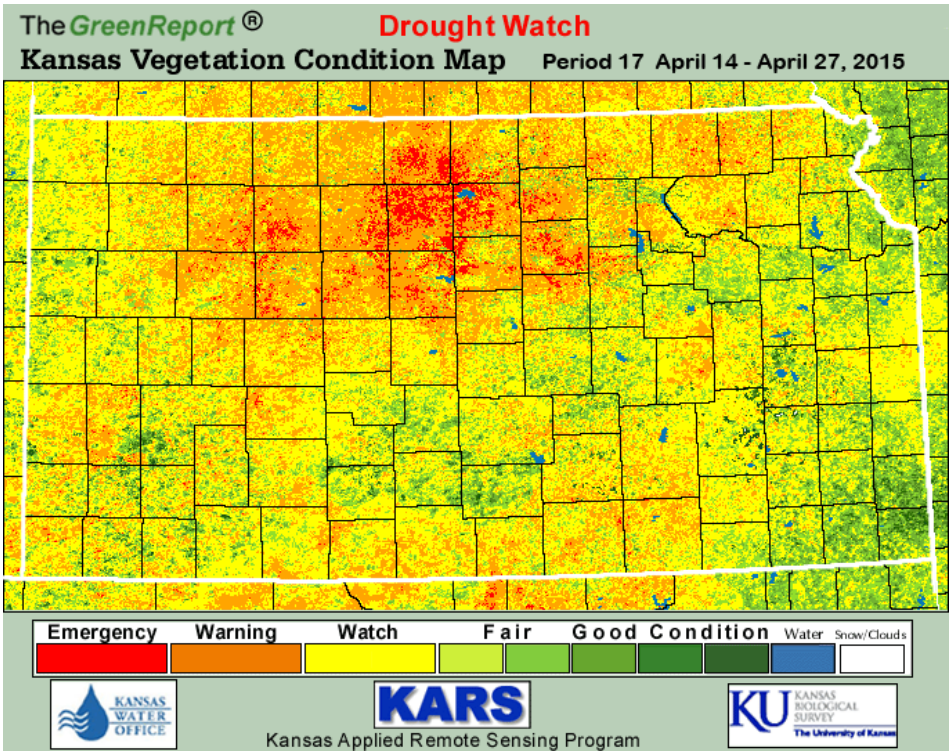
Kansas Minimum Desirable Streamflow (MDS) Gages Administration
April 30, 2015



Soil, Crop and Vegetation

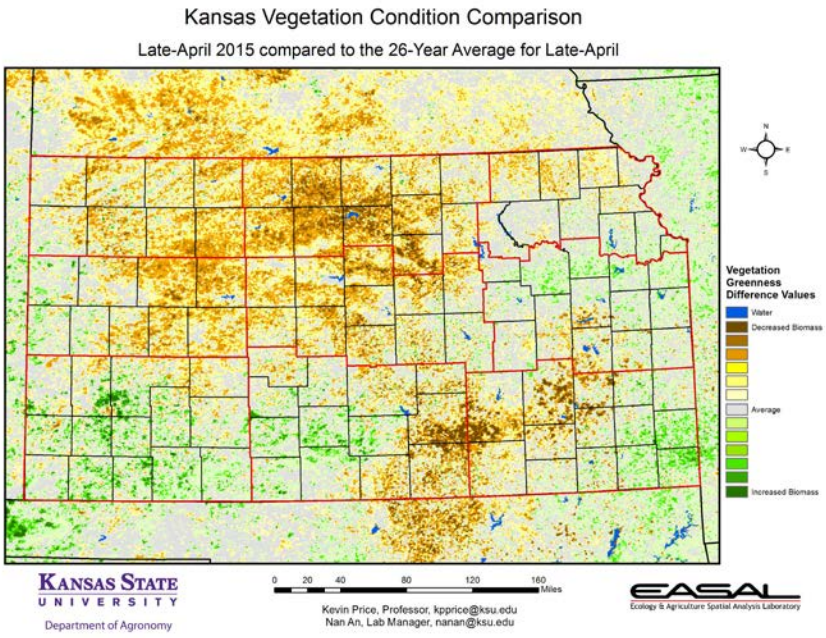
Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Vegetation in the central and northern areas of the state seem to be in poor condition. Some general improvement in the past week in eastern and western areas. Some wheat areas in the south-central are in poor condition.



The K-State Vegetative Condition Comparison to historical data is also provided below. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for April 14 – 27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that a large portion of Kansas from

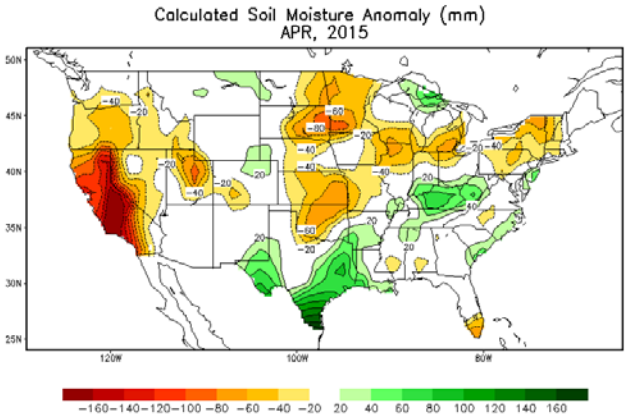
the Northwest Division through the South Central Division has lower biomass production. Only portions of the Southwest and extreme Southeastern divisions have higher than average photosynthetic activity. For much of these, this reduction in biomass production is a combination of winter-kill, freeze damage, and drought.



Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.



Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending April 26, 2015 reported topsoil moisture rated 13 percent very short, 24 short, 56 adequate, and 7 surplus. Subsoil moisture rated 20 percent very short, 34 short, 45 adequate, and 1 surplus

Field Crops: Winter wheat condition rated 4 percent very poor, 11 percent very poor, 20 poor, 43 fair, 24 good, and 2 excellent. Winter wheat jointed was at 78 percent, ahead of 54 last year and the five-year average of 68. Headed was 18 percent, ahead of 4 last year, but near 16 average.

Corn planted was at 32 percent, near 35 last year and 31 average. Emerged was 13 percent, near 10 last year and 9 average.

Soybeans planted was at 2 percent, ahead of 1 last year and average.

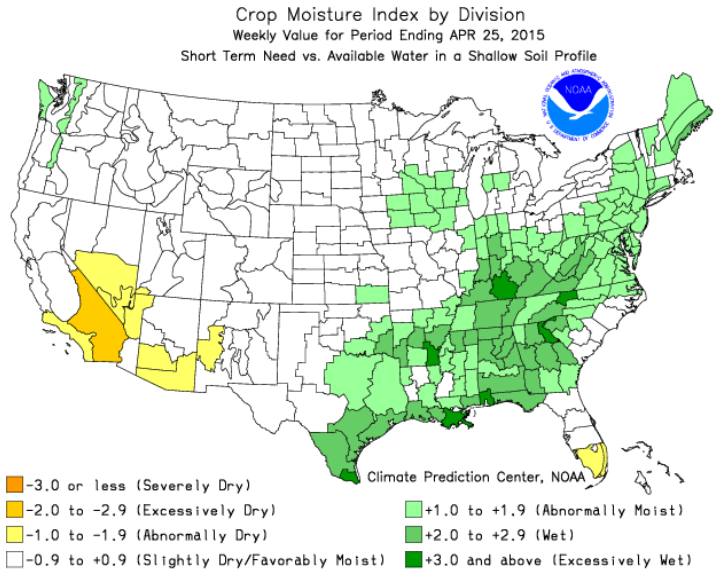
Cotton planted was at 1 percent, equal to last year and average.

Livestock: Cattle and calf conditions rated 1 percent very poor, 2 poor, 29 fair, 62 good, and 6 excellent. Cattle and calf death loss rated 0 percent heavy, 62 average, and 38 light.

Sheep and lamb conditions rated 0 percent very poor, 0 poor, 27 fair, 67 good, and 6 excellent. Sheep and lamb death loss rated 0 percent heavy, 62 average, and 38 light.

Hay and roughage supplies rated 2 percent very short, 14 short, 80 adequate, and 4 surplus.

Stock water supplies rated 13 percent very short, 26 short, 60 adequate, and 1 surplus.
http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf



The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF [Weekly Weather and Crop Bulletin](#).

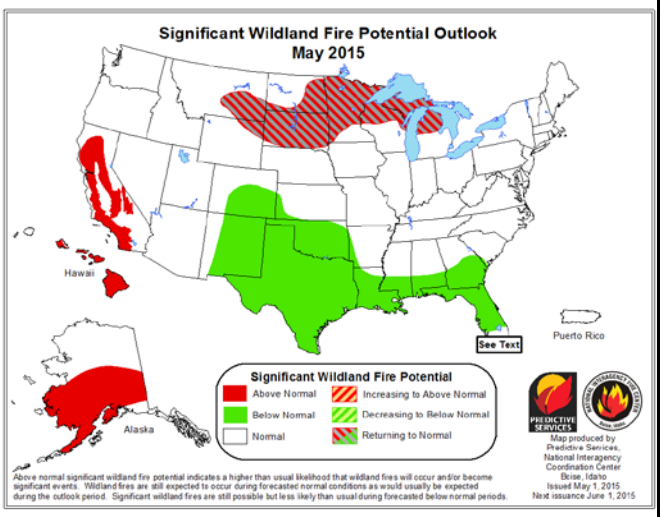
Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

Burn Bans and Fires

Due to condition March saw many days unsuitable for burning, when NOAA issued elevated or other fire weather outlooks.



According to the Kansas Adjutant General most recent posting on April 8, 2015, burn bans were in effect for the following counties: Brown, Clark, Crawford, Edwards, Ellis, Ellsworth, Franklin, Graham, Jefferson, Kearny, Lane, Lincoln, Linn, Ness, Norton, Ottawa, Philips, Rooks, Rush, Russell, Sherman, Smith, Stanton, and Trego counties.
(http://www.kansastag.gov/press_release_detail.asp?PRid=1031)

In addition County Burn Permit System was in place for the following counties: Allen, Anderson, Barton, Butler, Cheyenne, Clay, Cowley, Dickinson (permits issued by township, no permits currently being issued), Franklin, Geary, Gove, Hamilton, Jewell, Kingman, Kiowa, Leavenworth, Logan, Marion, Marshall, McPherson, Osage, Ottawa, Pottawatomie, Riley, Russell, Saline, Sedgwick, Seward, Stafford, Stanton, Wabaunsee, and Wyandotte counties. City Burn Permits Systems were in place for Bonner Springs and Edwardsville (no permits being issued).

The decision to implement a burn ban is made by county or city government leadership based on local conditions, To determine if your area has burning restrictions contact you county emergency management office or your local fire department or law enforcement dispatch center.

The Predictive Services section at the National Interagency Fire Center's Wildland Fire provides monthly fire hazard predictions. http://www.predictiveservices.nifc.gov/outlooks/outlooks.htm

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A
Known Conservation Stages
May 1, 2015

Public Water Supply	County	Conservation Stage	Stage[1]	Comment[2]
Ellis	Ellis	Water Emergency	3	
McCracken	Rush	Water Emergency	3	July 3, 2013/Dec. 22, 2013
Medicine Lodge	Barber	Water Emergency	3	July 1, 2013, still in place 5/1/15
Victoria	Ellis	Water Emergency	3	March 1, 2014, Warning April 15, 2013, still in place 5/1/15
Ellsworth	Ellsworth	Water Warning	2	1/6/14 chg stage 3 to 2
Russell	Russell	Water Emergency	2	

[1] 1 = Water Watch
2 = Water Warning
3 = Water Emergency

[2] CN Assurance = Cottonwood & Neosho River Water Assurance District
K Assurance = Kansas River Water Assurance District
M Assurance = Marais des Cygnes River Water Assurance District
Marketing = Water Marketing Program

APPENDIX B

Appendix C

April 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	2.36	0.90	162%	51.8	3.9	82 (30)	27 (13,10)
Dodge City	1.80	-0.02	99%	56.8	2.9	89 (6)	27 (10)
Garden City	0.36	-1.36	21%	54.4	1.4	89 (6)	24 (10)
Goodland	4.84	3.25	304%	51.6	2.4	84 (1)	27 (3)
Guymon, OK	1.46	-0.05	97%	58.2	3.0	89 (8,1)	28 (10)
Hill City	3.55	1.43	167%	55.1	3.5	89 (1)	29 (10)
Lamar, CO	1.06	-0.26	80%	54.6	2.4	86 (8)	24 (10)
McCook, NE	1.95	-0.36	84%	54.1	4.6	87 (1)	27 (10)
Springfield, CO	0.85	-0.42	67%	52.0	0.4	81 (30,8)	23 (10)
Central							
Concordia	2.23	-0.22	91%	55.2	2.2	84 (1)	34 (10,4)
Hebron, NE	2.04	-0.75	73%	53.8	2.8	84 (1)	30 (22)
Medicine Lodge	3.48	1.05	143%	59.8	3.7	93 (6)	24 (4)
Ponca City, OK	2.20	-1.24	64%	61.5	3.1	91 (7)	25 (4)
Salina	1.83	-1.22	60%	57.9	2.7	87 (1)	26 (4)
Wichita (ICT)	2.62	0.03	101%	60.3	4.2	87 (1)	25 (4)
East							
Bartlesville, OK	2.91	-1.07	73%	60.8	2.0	91 (7)	27 (4)
Chanute	4.53	0.13	103%	59.3	2.5	87 (7)	27 (4)
Fall City, NE	3.09	-0.09	97%	55.6	2.4	83 (1)	27 (4)
Johnson Co. Exec. Apt	3.17	-0.82	79%	57.6	2.5	84 (7)	29 (4)
Joplin, MO	3.95	-0.52	88%	59.4	1.0	84 (7)	30 (4)
Kansas City (MCI), MO	3.29	-0.41	89%	56.8	2.0	85 (7)	29 (4)
St. Joseph, MO	2.85	-0.94	75%	55.8	1.6	85 (7)	27 (4)
Topeka (TOP	2.40	-1.13	68%	57.2	2.1	86 (7)	28 (4)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE –May 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General – Drought

- Executive Order 14-04 issued by Governor Brownback May 21, 2014, remains in effect. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.
- The severity of drought has lessened throughout Kansas, the US Drought Monitor indicated dry conditions still persist across 33 percent of Kansas at the end of May.
- USDA declared 29 Kansas Counties Primary Disaster areas for 2015 due to drought. An additional 14 contiguous counties are also eligible federal for assistance.

General Flooding

Water Supply

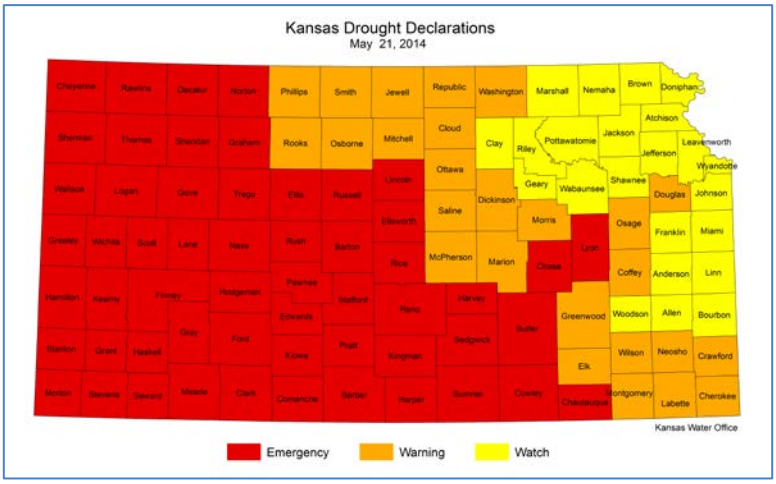
- Some supplies remain a concern to local operators – Ellis, McCracken, and Victoria.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration is in effect on 2 rivers at 2 gage locations.

Kansas County Drought Declarations: Executive Order 14-04 was issued by Governor Brownback May 21, 2014, modifying drought declarations for Kansas counties. Drought stages are in effect for all 105 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use. Crop and pasture conditions also play a role in declaration determination. Drought Emergency applies to 56 counties, Warning 26 and Watch 23.

Drought Emergency:
Barber, Barton, Butler, Chase, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Decatur, Edwards, Ellis, Ellsworth, Finney, Ford, Gove, Graham, Grant, Gray, Greeley, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Lane, Lincoln, Logan, Lyon, Meade, Morton, Ness, Norton, Pawnee, Pratt, Rawlins, Reno, Rice, Rush, Russell, Scott, Sedgwick, Seward, Sheridan, Sherman, Stafford, Stanton, Stevens, Sumner, Thomas, Trego, Wallace, Wichita.

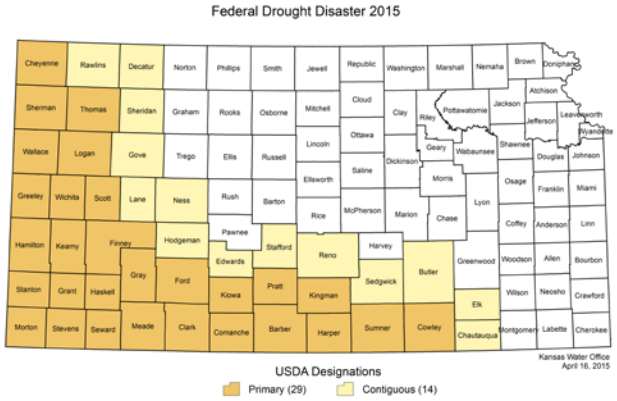


Drought Warning: Cherokee, Cloud, Coffey, Crawford, Dickinson, Douglas, Elk, Greenwood, Jewell, Labette, Marion, McPherson, Mitchell, Montgomery, Morris, Neosho, Osage, Osborne, Ottawa, Phillips, Rooks, Republic, Saline, Smith, Washington, Wilson.

Drought Watch: Allen, Anderson, Atchison, Bourbon, Brown, Clay, Doniphan, Franklin, Geary, Jackson, Jefferson, Johnson, Leavenworth, Linn, Marshall, Miami, Nemaha, Pottawatomie, Riley, Shawnee, Wabaunsee, Woodson, Wyandotte.

Federal: USDA has designated 29Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 14contiguous counties are also eligible for natural disaster assistance. These are Butler, Chautauqua, Decatur, Edwards, Elk, Gove, Hodgeman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford and Sumner.



Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

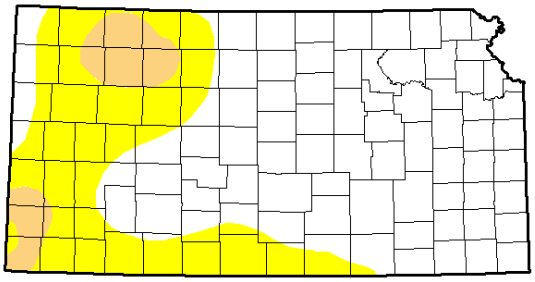
Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

General Conditions

Wet weather in May has resulted in continued improvement in the U.S. Drought Monitor. This improvement was greatest in the eastern two thirds of the state, which are now identified as drought-free by the Drought Monitor. Severe drought was eliminated in the western portions of the state. Only small pockets of moderate drought remain in extreme Southwestern and parts of North Central, KS. However, continued normal to above normal precipitation is needed to continue improvements. Also, some long-term hydrological deficits are in place affecting some water supplies and reservoirs.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.



U.S. Drought Monitor

Kansas

May 26, 2015

(Released Thursday, May. 28, 2015)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	66.92	33.08	6.23	0.00	0.00	0.00
Last Week 5/19/2015	39.71	60.29	32.40	7.55	0.00	0.00
3 Months Ago 2/24/2015	11.06	88.94	41.70	18.67	1.88	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 5/27/2014	0.00	100.00	98.84	80.81	48.31	3.09

Intensity:

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

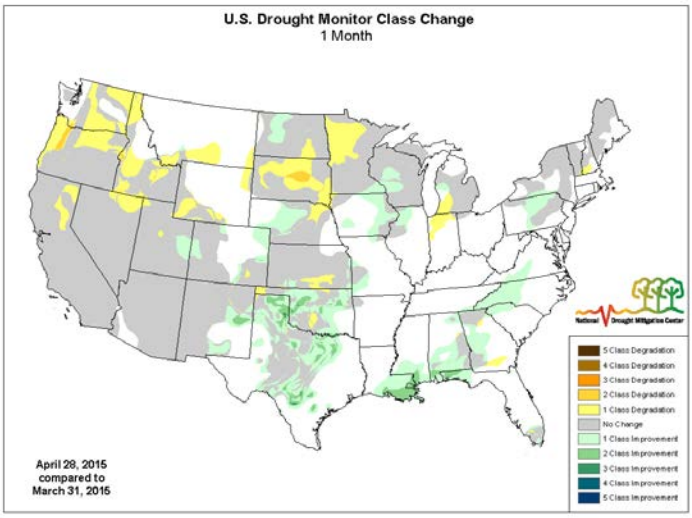
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Brad Rippey
U.S. Department of Agriculture

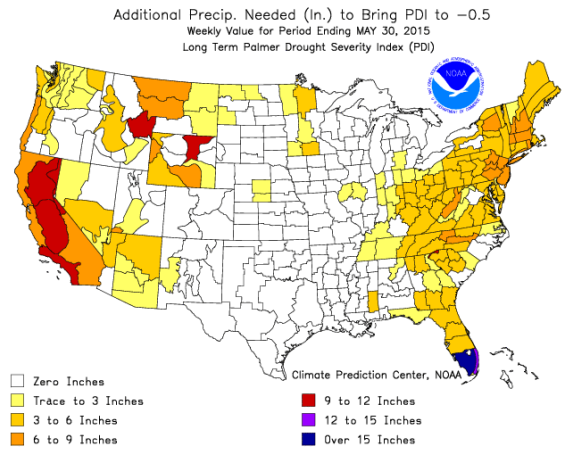
http://droughtmonitor.unl.edu/

The El Niño is still ranked as a weak event. However, the sea-surface temperature anomalies are at some of the highest levels seen at this time of the year. Normally, an El Niño starts during the fall and strengthens during the winter. El Niño conditions tend to favor wetter than normal summers in Kansas.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)



http://droughtmonitor.unl.edu



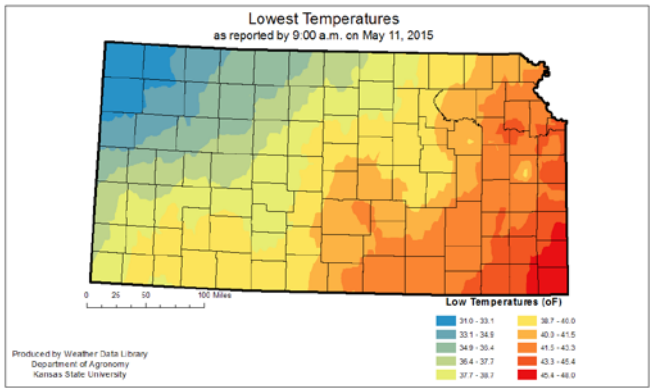
The next table provides climate division moisture needs to end drought.

Climate Division	Precipitation needed to End Drought (inches)				
	Week ending May 2	Week ending May 9	Week ending May 1	Week ending May 23	Week ending May 30
Northwest	5.00	3.88	4.01	-	-
West Central	1.24	-	-	-	-
Southwest	1.37	-	-	-	-
North Central	3.56	1.20	-	-	-
Central	1.53	-	-	-	-
South Central	-	-	-	-	-
Northeast	0.99	-	-	-	-
East Central	1.34	-	-	-	-
Southeast	0.86	-	-	-	-

Climate Summary (Temperature and Precipitation)

The combination of cooler than normal temperatures coupled with much higher than average precipitation resulted in significant improvement in the drought situation. At the start of the month approximately two percent of the state was in extreme drought and only 9 percent was drought-free. By the end of the month only 6 percent of the state was in moderate drought and 67 percent was drought-free.

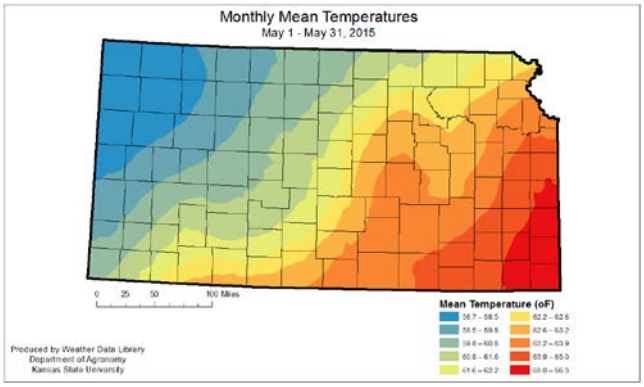
The May temperatures were cooler than normal. The mean monthly temperature was 61.6°F, or 1.9 degrees cooler than normal. This ranks as the 31st coldest May in the 121 year record. That would place it in the upper portion of the coldest third of the record. The coldest reading was 29°F at Norton (Norton County) and Oberlin (Decatur County) on May 12th. The warmest reading was 95°F, Sharon Springs (Wallace County) on the 20th. The widespread low temperatures on the 12th of May continued to stress winter wheat, particularly in fields where wheat was flowering. Additionally, the cool, wet conditions have resulted in uneven emergence in the spring planted crops such as corn and soybeans. The warmest divisions were the Southeast and East Central, which averaged 1.0 degrees cooler than normal. The Southwest had the largest departure with an average of 61.1°F, or 2.7 degrees cooler than normal. With the cooler than average temperatures for the month, it is not surprising that 99 new record daily cool highs were set. None of those records were new for the month. There were seven records set for high daily maximums. On the low temperature side, fewer records were set. There were 18 record low minimums set and two record high minimums recorded.

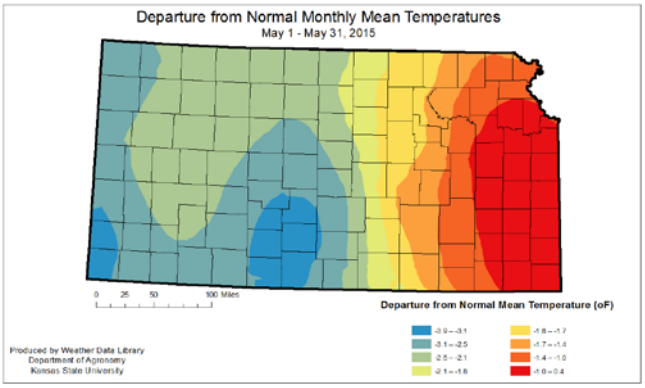


The table below summarizes temperatures by Kansas climate division and various time periods. Please note the data used in compiling is preliminary and comes from different sources. This may result in slight differences in the average or extreme values presented.

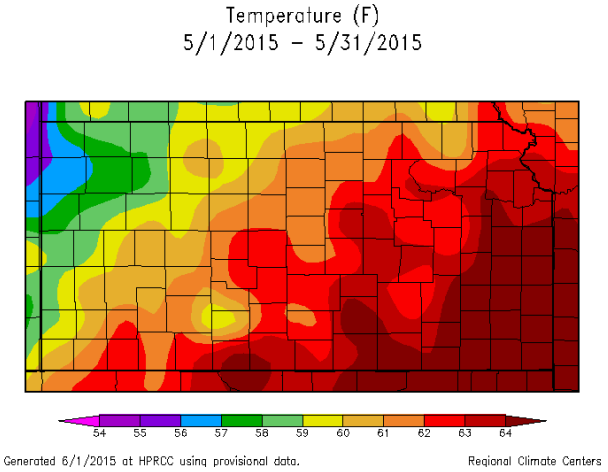
	Kansas Climate Division Temperature Summary (°F)							
	May 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	69.7	46.2	57.9	-2.3	93	4	29	12
West Central	70.9	46.8	58.9	-2.3	95	20	32	12
Southwest	72.8	49.4	61.1	-2.7	91	3	37	9
North Central	71.9	50.4	61.2	-2.0	93	4	30	21
Central	72.5	51.7	62.1	-2.2	92	4	32	12
South Central	72.8	53.1	62.9	-2.4	87	3	34	12
Northeast	72.3	53.1	62.7	-1.1	87	4	37	1
East Central	72.4	54.1	63.2	-1.0	86	4	36	12
Southeast	73.5	55.3	64.4	-1.0	86	28	38	11
STATE	72.1	51.1	61.6	-1.9	95	20th	29	12th
Data Source: KSU Weather Library								

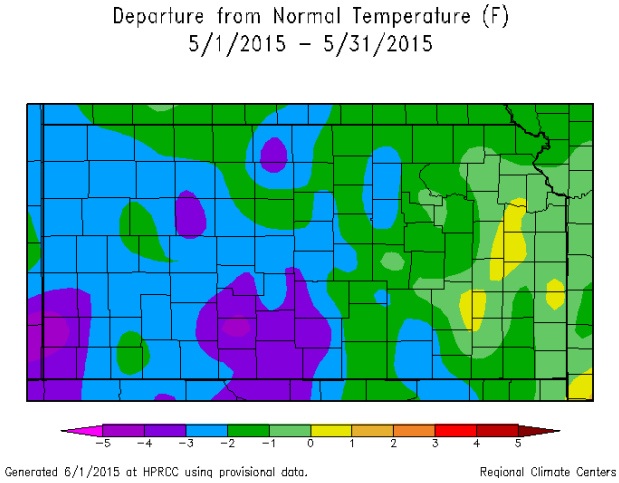
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.

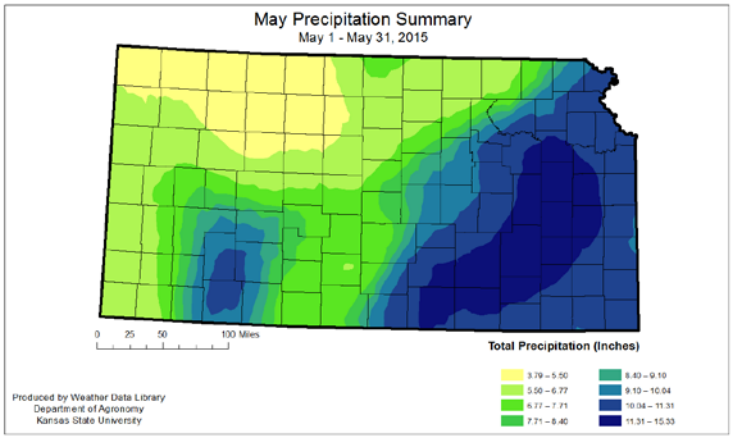


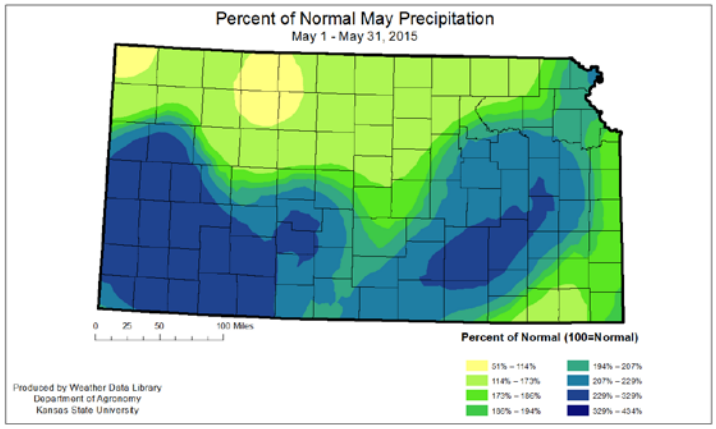


The state-wide average precipitation for the month was 7.73 inches, which was 188 percent of normal. It ranks as the third wettest May since 1895. All divisions had greater than average precipitation for the month. The Northwest Division came closest to average at 113 percent of normal or an average of 3.93 inches. The Southeast Division averaged the greatest overall precipitation at 10.63 inches, but just 186 percent of normal. The Southwest Division averaged 7.79 inches which was 279 percent of normal. Lebo in Coffey County was the wettest NWS Cooperative observer station with 15.56 inches. The wettest station in the Community Collaborative Rain Hail and Snow Network (CoCoRaHS) was at Topeka 5.5 SE, Shawnee County, with 15.53 inches. Manhattan (Riley County) had the highest 24hr total for the NWS network with 4.85 inches on the 5th. The highest daily total for the CoCoRaHS network was 7.92 at Webber 2.6 ENE, Jewell County on the 7th. Three all-time May record daily rainfall amounts were set: 3.83 inches at Lindsborg on the 5th, 3.72 inches at Overbrook on the 22nd and 3.95 inches at John Redmond on the 28th.

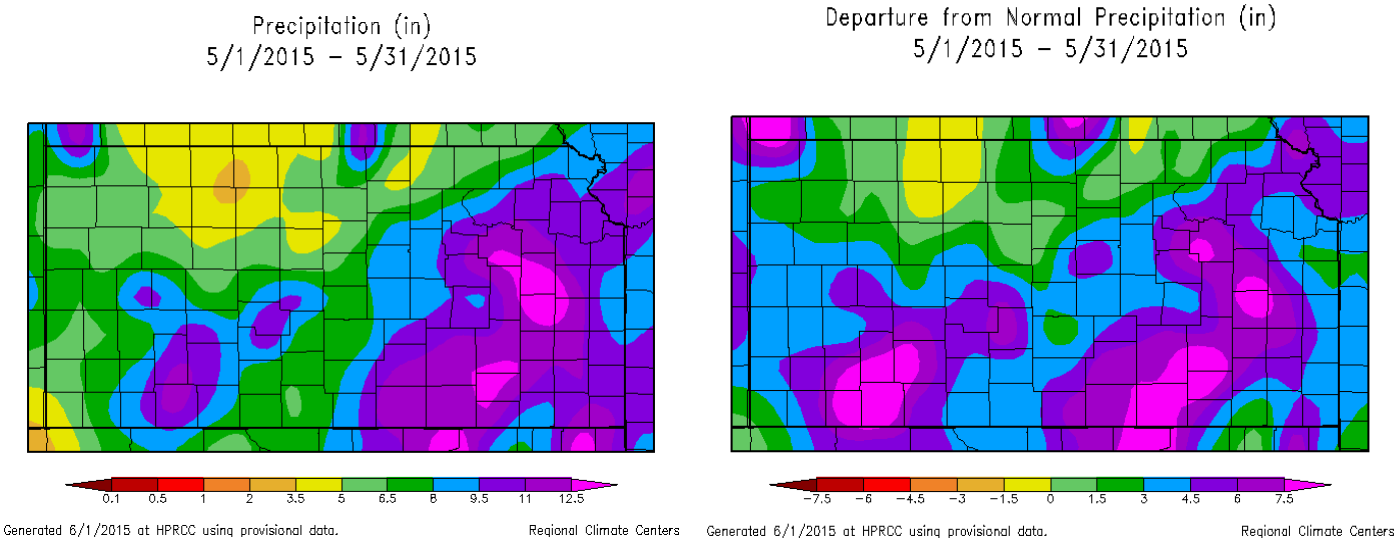
Kansas Climate Division Precipitation Summary (inches) Summary May 2015												
Climate Division	May 1-31, 2015			January 1 – May 31, 2015			April 1 – May 31, 2015			September 1 – May 31, 2015		
	Actual	Depart [1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	3.93	0.47	113	7.16	-0.67	92	6.60	1.07	120	10.26	-2.05	84
West Central	5.83	2.80	199	8.69	1.26	118	7.81	2.87	162	12.67	0.76	107
Southwest	7.73	5.00	279	10.67	3.92	156	8.86	4.49	199	15.58	4.37	137
North Central	5.11	1.03	122	9.29	-0.78	90	7.96	1.36	119	14.7	-2.09	85
Central	7.59	3.32	178	11.42	0.54	104	9.93	3.00	143	19.38	1.68	109
South Central	9.52	5.13	215	15.00	3.29	128	13.35	6.26	188	20.67	1.10	106
Northeast	7.95	3.16	167	12.65	0.40	103	10.45	2.41	131	21.98	0.40	101
East Central	9.80	4.65	188	14.82	1.19	107	12.67	3.97	144	25.01	1.07	102
Southeast	10.63	4.84	186	16.65	0.99	107	14.61	4.95	152	29.27	1.52	105
STATE	7.73	3.56	188	12.01	1.33	114	10.43	3.59	154	19.02	0.95	105

Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





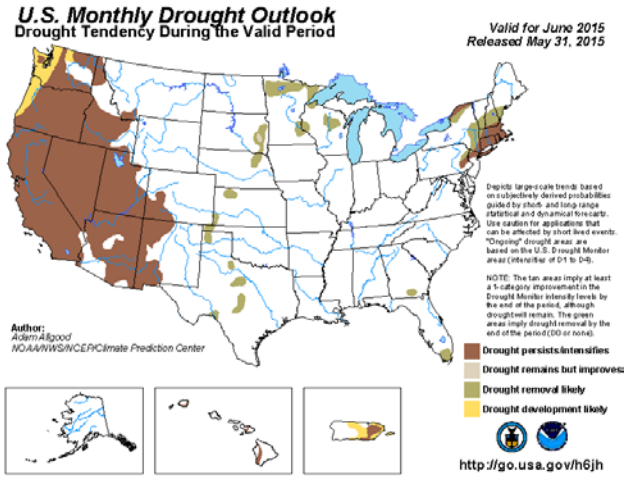
Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

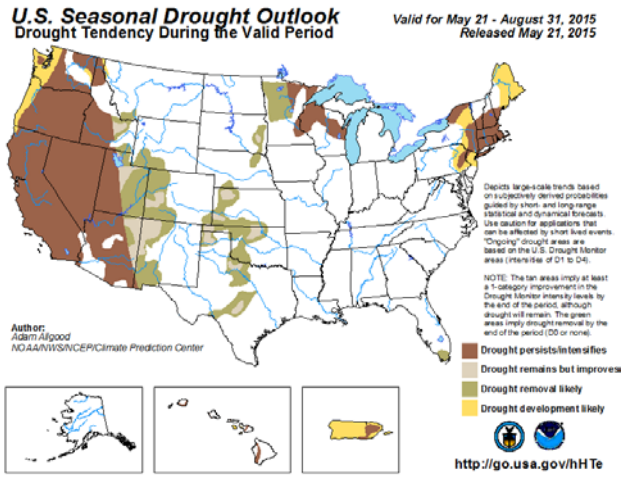


The severe weather activity increased in May. Preliminary data indicates 99 tornadoes for the month. This is compared to an annual total of just 48 tornadoes last year, and 58 in 2013. Damaging wind reports totaled 52, while hail reports numbered 108. Flooding was also an issue in May.

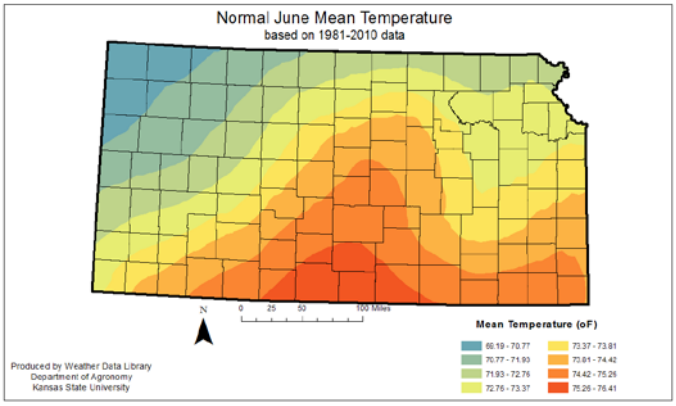
Future Outlook

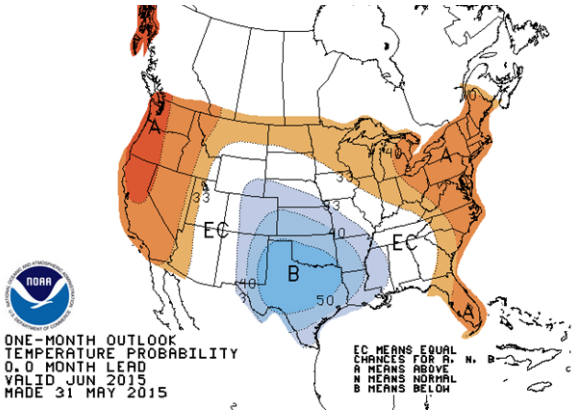
The June temperature outlook calls for greater chances of normal temperatures for most of the state. The June precipitation outlook is for wetter than normal conditions state-wide, as is the outlook for the summer.

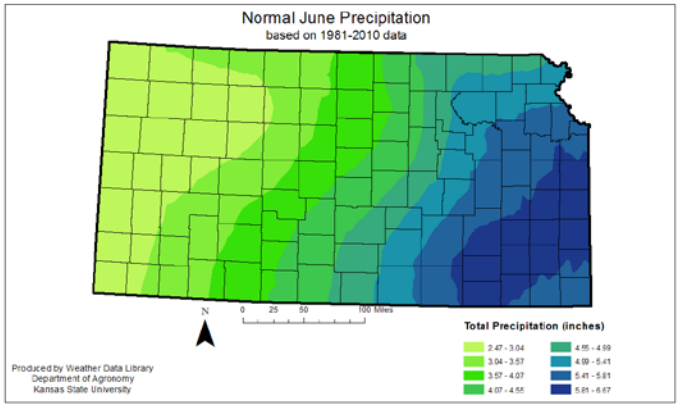


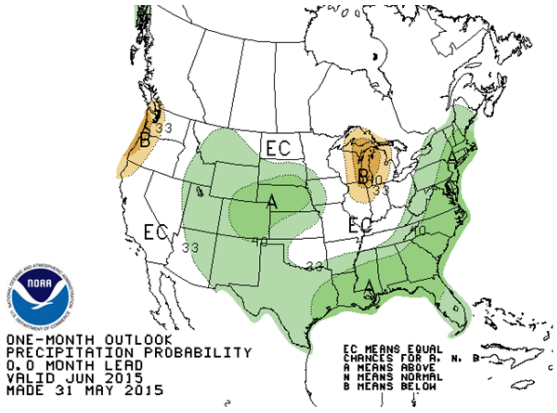


June outlook and normal Kansas June temperatures and precipitation are compared below. Below normal temperatures are favored for June. Precipitation is favored to be above normal for all but the south east corner of Kansas where it is equally likely to be normal, above or below.

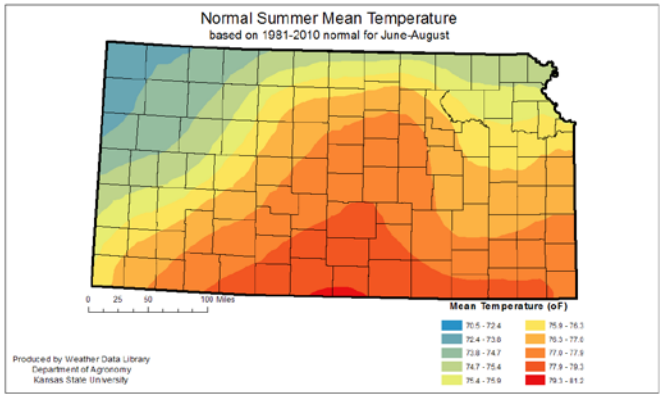


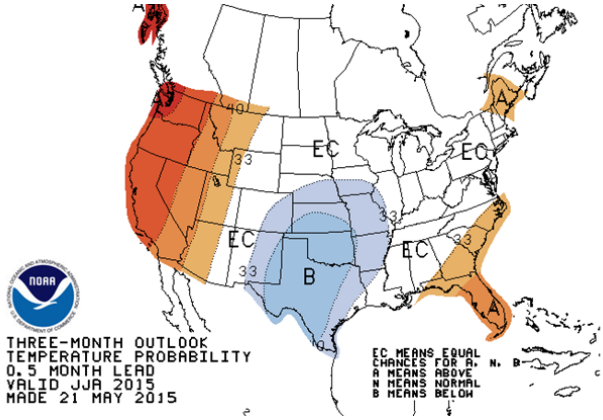


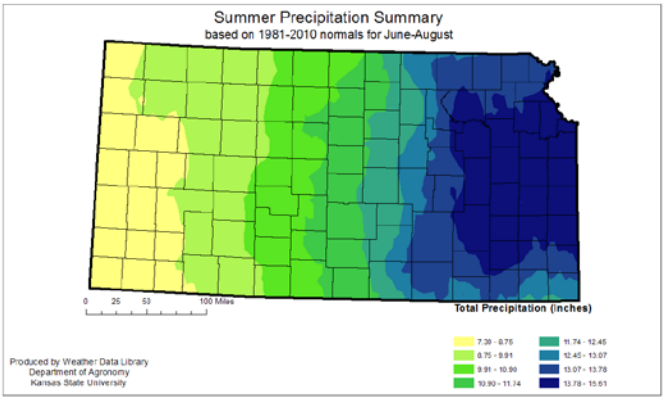


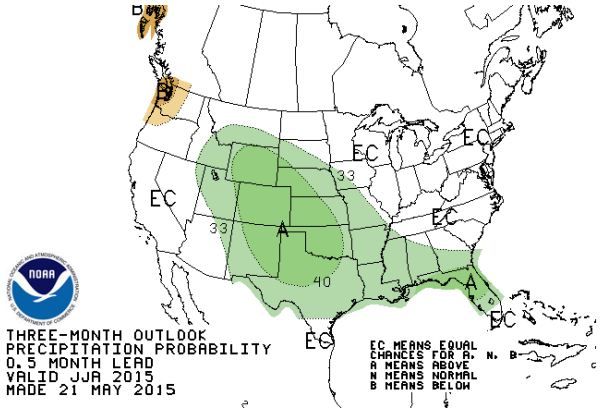


The summer (three-month) outlook favors below normal temperatures and above normal precipitation for June through August.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

The most current list of public water suppliers known or required to be in conservation are included in Appendix A. As there are no reporting requirements for reporting water supply stages this list is based on the best information available.

Surface Water Supply Conditions

The conservation pool at the water supply reservoirs are full, discharges of excess for flood protection occurring. The next section provides end of the month status for some Federal reservoirs in the Arkansas River Drainage managed by the Tulsa District of the US Army Corp of Engineers.

Reservoir Status -Flood

The U.S. Army Corp of Engineers, Tulsa District managed flood waters on multiple Oklahoma, Southeastern Kansas and Northern Texas projects along the Red River and Arkansas River Basins.

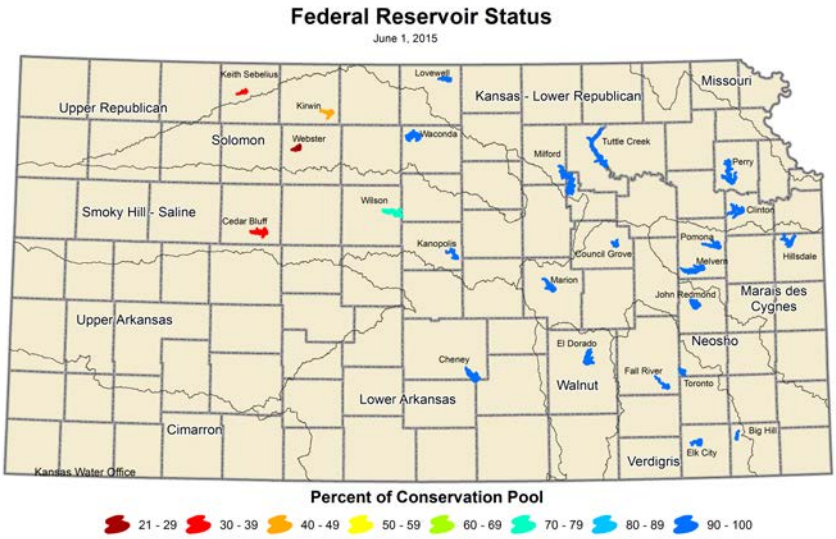
Reported May 30 for the Arkansas River Basin in Kansas:

On the Verdigris River, Toronto (107%) is falling with releases 15,600 cfs; Elk City (69%) is rising and discharging at 6 cfs. Elk City's new projected peak is 89% of pool on 6 June; Fall River (67%) is also rising with a discharge of 5 cfs and forecasted peak at 68% on 1 June

Reported May 31 for the Arkansas River Basin in Kansas:

Toronto (99%) is also out of surcharge and continues to fall with releases of 6,000 cfs. Elk City (73%) is rising and discharging at 6 cfs. Elk City's new projected peak is 77% of pool on 4 June. Fall River (69%) is also rising with a discharge of 5 cfs and forecasted peak at 73% on 1 June.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

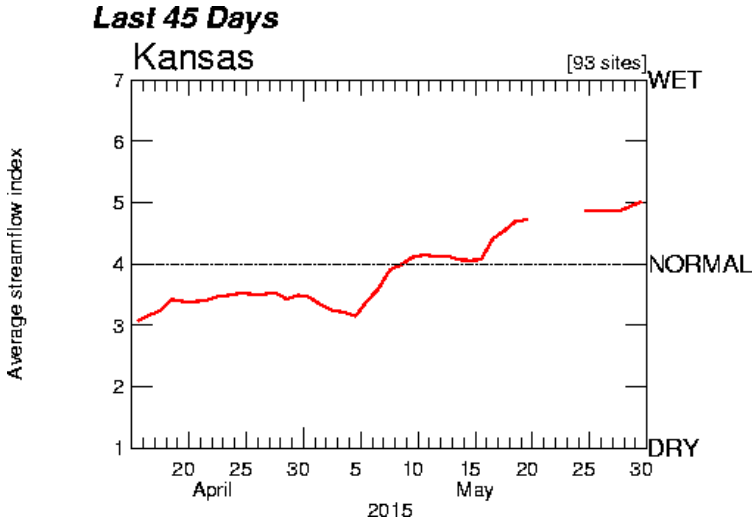
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**06/01/2015 06:00 AM**		
Norton[1]	2304.3	2288.70	-15.60	30.0
Harlan County, NE	1945.73	1935.49	-10.24	61.5
Lovewell[1]	1582.6	1584.69	2.09	100.0
Milford[1]	1144.4	1146.58	2.18	100.0
Cedar Bluff	2144	2121.14	-22.86	35.7
Kanopolis[1]	1463	1467.92	4.92	100.0
Wilson[1]	1516	1507.58	-8.42	71.5
Webster[1]	1892.5	1871.35	-21.10	25.7
Kirwin[1]	1729.3	1716.09	-13.16	45.3
Waconda[1]	1455.6	1454.51	-1.09	93.9
Tuttle Creek[1]	1075	1078.24	3.24	100.0
Perry[1]	891.5	900.29	8.79	100.0
Clinton[1]	875.5	882.57	7.07	100.0
Melvern[1]	1036	1045.89	9.89	100.0
Pomona[1]	974	989.96	15.96	100.0
Hillsdale[1]	917	923.92	6.92	100.0
Arkansas River Basin		**06/01/2015 08:00 AM**		
Cheney	1421.6	1422.63	1.03	100.0
El Dorado	1339	1344.05	5.05	100.0
Toronto[1]	901.5	930.07	28.57	100.0
Fall River[1]	948.5	980.20	31.70	100.0
Elk City[1]	796	820.21	24.21	100.0
Big Hill	858	859.17	1.17	100.0
Council Grove[1]	1274	1285.44	11.44	100.0
Marion[1]	1350.5	1351.24	0.74	100.0
John Redmond[1]	1039	1067.51	24.51	100.0

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

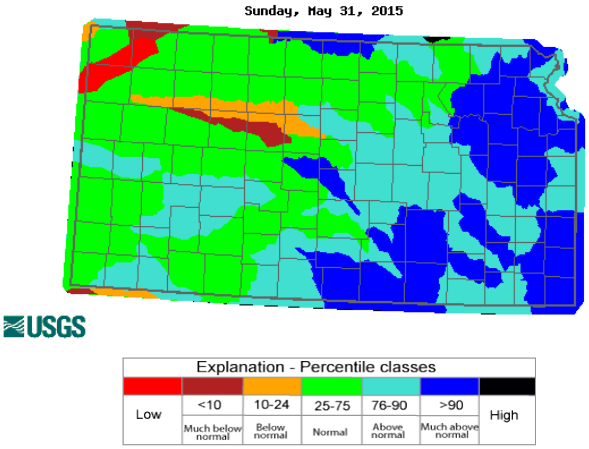
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

Streamflow Conditions

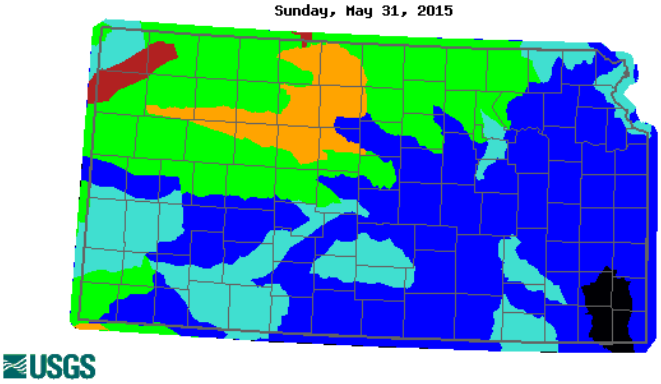
Kansas streamflows improved during May, only being relatively low in a few western Kansas watersheds. Generally, flows averaged normal or above normal in eastern Kansas and normal in May as shown in the graph below left.



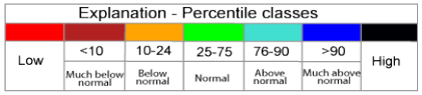
The comparison of present **28-day** streamflow to historical is shown on the map below.



The comparison of present **7-day** streamflow to historical is shown on the map below left.



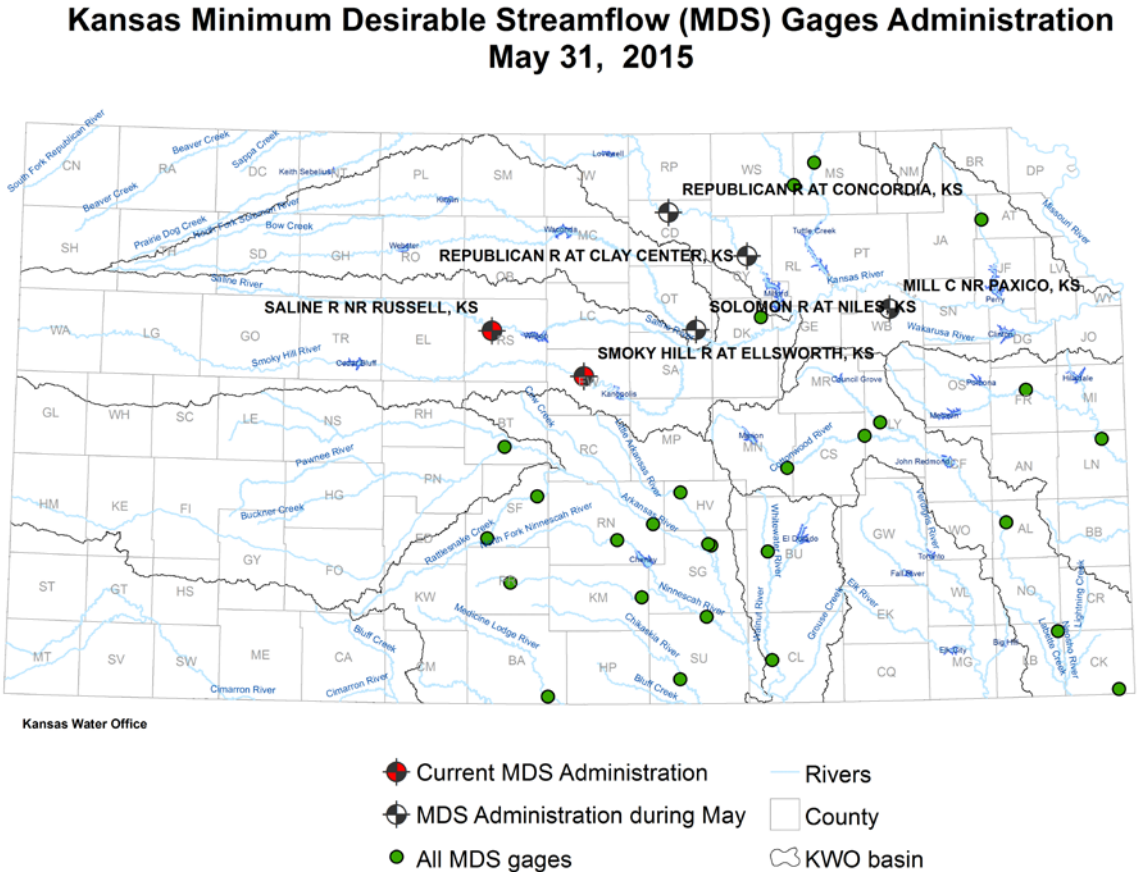
In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

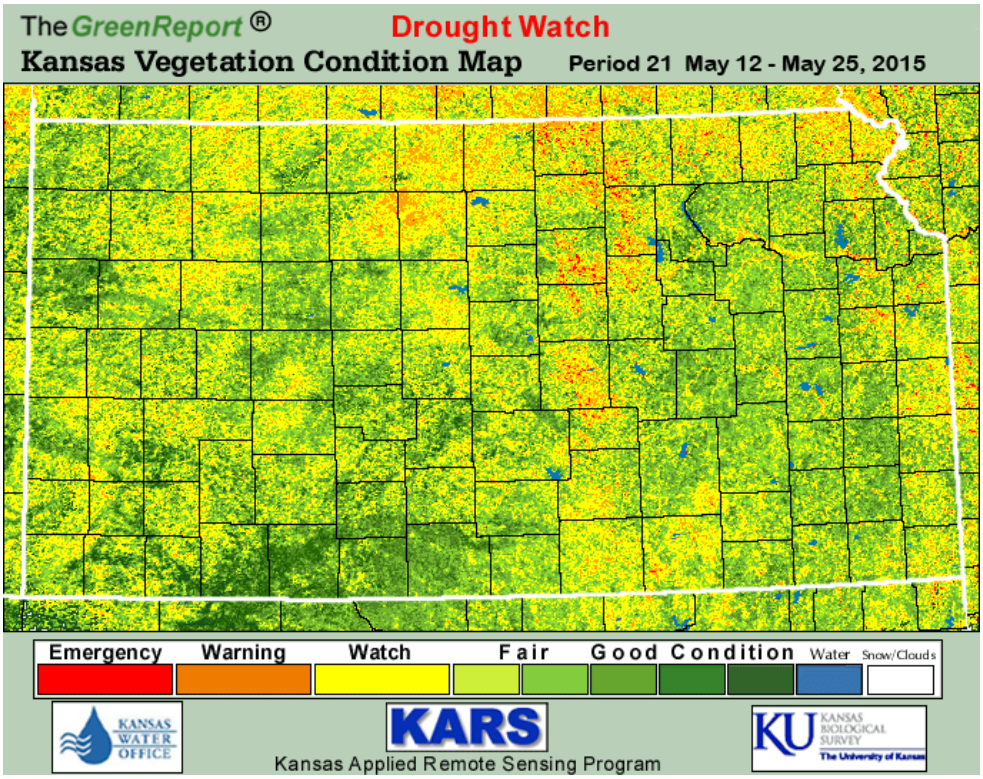
Streamflows in cubic feet per second (cfs)								
Gaging Station	**Flow May 7**	**Flow May 14**	**Flow May 21**	**Flow May 28**	**May MDS**	**June MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	76	1,730	538	306	150	150	03/20/15; ceased 05/29/15	
Republican River at Clay Center	154	1,900	1,520	707	250	250	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	31	28	85	105	35	45	03/23/15	3
Saline River near Russell	5	14	1	12	15	12	10/22/2014	8
Solomon River at Niles	70	323	705	524	90	90	03/23/15; ceased 05/28/15	
Mill Creek near Paxico	178	250	87	789	30	35	04/15/15; ceased 05/19/15	



Soil, Crop and Vegetation

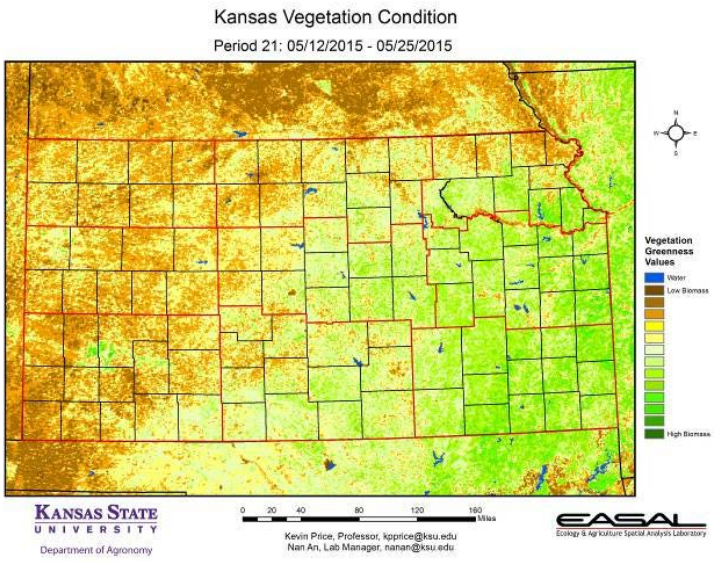
Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Great improvement in western and southern areas of the state. The rain has worked wonders in these areas. Northern areas need a little more moisture to catch up.



The K-State Vegetative Condition Comparison to historical data is also provided below Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report May 12 – May 15, 2015 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that a large portion of Kansas from the Northwest Division through the South Central Division has lower biomass

production. Only portions of the Southwest and extreme Southeastern divisions have higher than average photosynthetic activity.



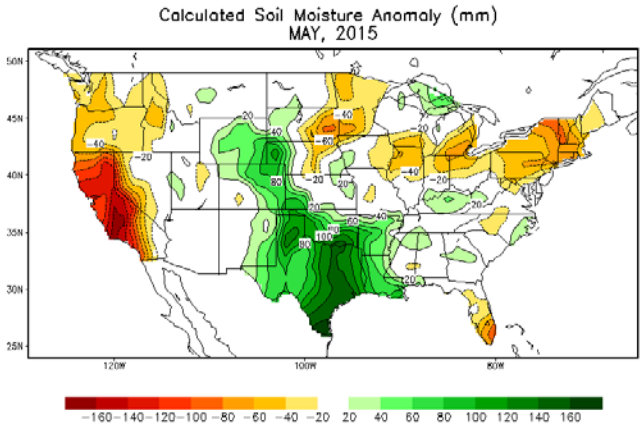
Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology.
http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at:
http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

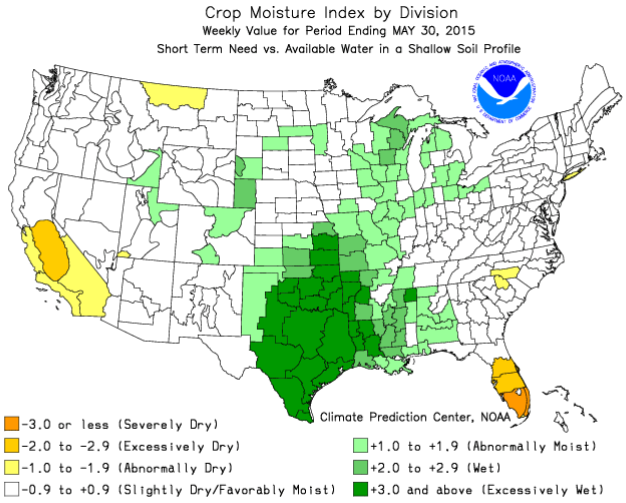
USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending May 31, 2015 reported topsoil moisture rated 2 percent very short, 7 short, 64 adequate, and 27 surplus. Subsoil moisture rated 6 percent very short, 16 short, 67 adequate, and 11 surplus.



Field Crops: Winter wheat condition rated 10 percent very poor, 19 poor, 41 fair, 28 good, and 2 excellent. Winter wheat headed was 97 percent, near 95 for last year and the five-year average. Coloring was at 34 percent, near 33 last year and 35 average.

Corn condition rated 2 percent very poor, 10 poor, 38 fair, 46 good, and 4 excellent. Corn planted was at 86 percent, behind 96 last year and average of 97. Emerged was 72 percent, behind 84 last year and 82 average.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 2 very poor, 7 poor, 30 fair, 50 good, and 11 excellent. Stock water supplies rated 4 percent very short, 10 short, 73 adequate, and 13 surplus. (http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)



The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations.

Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.

Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at:

http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at:
http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf
An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides

financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:
http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

May 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	7.20	4.62	279%	56.4	-2.1	83 (31)	32 (10)
Dodge City	10.33	7.48	362%	61.5	-2.7	89 (3)	38 (12,11)
Garden City	7.37	4.49	256%	60.0	-3.3	89 (2)	37 (12)
Goodland	5.76	2.81	195%	56.9	-2.5	85 (3)	32 (11,10)
Guymon, OK	6.53	4.09	268%	62.6	-2.3	89 (3)	38 (11)
Hill City	3.50	-0.28	93%	60.4	-2.1	88 (3)	31 (12
Lamar, CO	6.38	4.36	316%	59.4	-2.8	86 (31,3)	32 (11)
McCook, NE	3.84	0.70	122%	60.0	0.4	90 (3)	29 (12)
Springfield, CO	4.50	2.14	191%	57.2	-4.1	83 (31)	32 (10)
Central							
Concordia	4.22	0.06	101%	61.9	-1.2	89 (3)	38 (11)
Hebron, NE				61.2	-0.5	91 (3)	37 (12)
Medicine Lodge	6.79	3.49	206%	63.7	-3.3	86 (3)	39 (12)
Ponca City, OK	10.20	5.39	212%	66.1	-1.5	84 (27,4)	43 (21,12)
Salina	8.28	3.53	174%	64.0	-1.3	88 (3)	36 (12)
Wichita (ICT)	11.77	7.20	258%	65.1	-0.9	85 (4)	40 (12)
East							
Bartlesville, OK	7.76	2.44	146%	65.3	-2.4	85 (7,3)	40 (1)
Chanute	11.58	5.78	200%	65.0	-0.9	83 (27,4)	39 (12)
Fall City, NE	6.02	1.44	131%	62.8	-1.0	85 (3)	40 (21)
Johnson Co. Exec. Apt	10.60	5.17	195%	64.2	-0.5	83 (4)	44 (12,11)
Joplin, MO	6.23	1.13	122%	66.5	1.7	85 (27)	42 (22)
Kansas City (MCI), MO	10.25	5.02	196%	63.5	-1.0	83 (4,3)	41 (12)
St. Joseph, MO	9.76	4.34	180%	63.7	-0.7	85 (3)	41 (12)
Topeka (TOP	9.43	4.54	193%	64.3	-0.7	86 (3)	40 (12)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – June 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General – Drought

- June 29, 2015, Executive Order (EO) 15-04 replaced EO14-04 issued by Governor Brownback May 21, 2014. A drought watch was designated for 33 counties.
- The severity of drought has lessened throughout Kansas, however the US Drought Monitor indicated dry conditions still persist across 10 percent of Kansas.
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, all are due to drought. An additional 14 contiguous counties are also eligible federal for assistance.

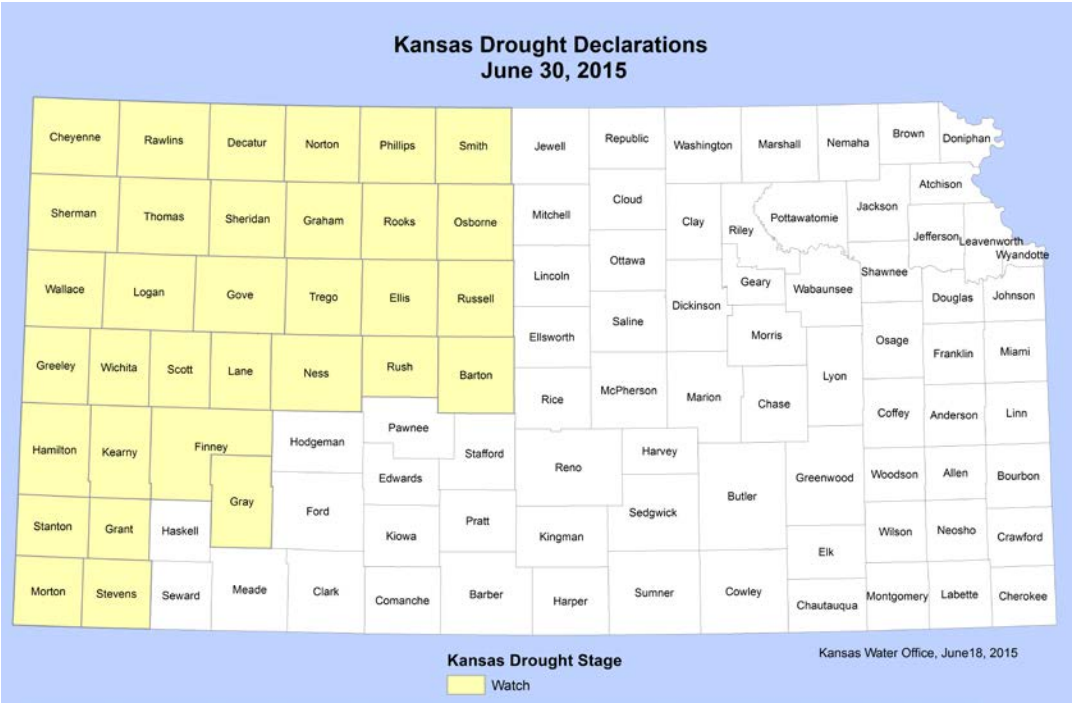
Water Supply

- June 29, 2015 mandatory Stage III water restrictions are in place for Russell water customers.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration is in effect on the Saline and Smoky Hill rivers.
- Blue-Green Algae Bloom Warning is in effect for Chisolm Creek Park Lake, Sedgwick County; and Memorial Park Lake, Barton County (June 26, 2015).
- Blue-Green Algae Bloom Watch is in effect for Jewell State Fishing Lake, Jewell County; Lake Meade State Park, Meade County; and Marion Reservoir, Marion County (June 26, 2015).

Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.

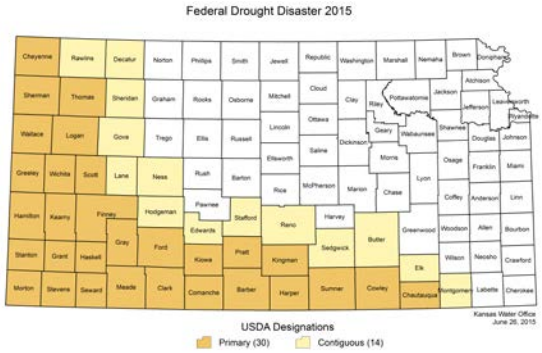


Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal: USDA has designated 30 Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell,

Kearny, Kingman, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 14contiguous counties are also eligible for natural disaster assistance. These are Butler, Chautauqua, Decatur, Edwards, Elk, Gove, Hodgeman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford, Sumner and Montgomery.



Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

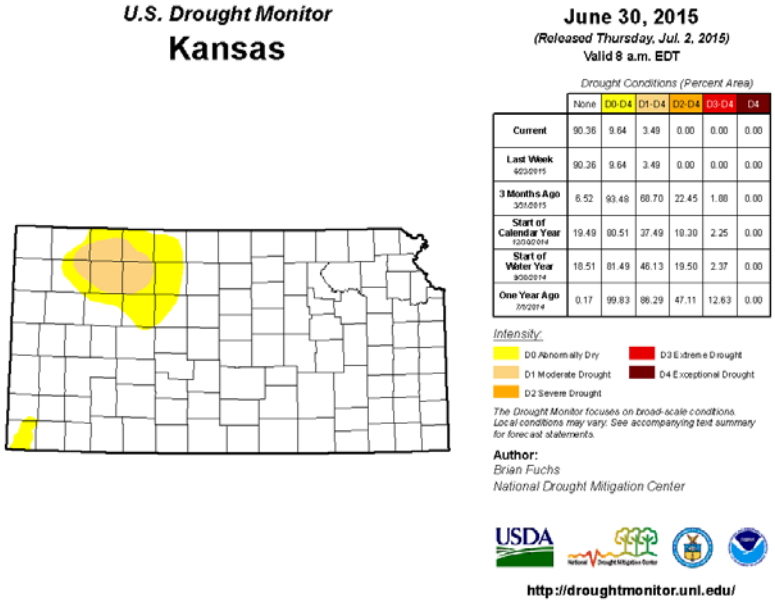
Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

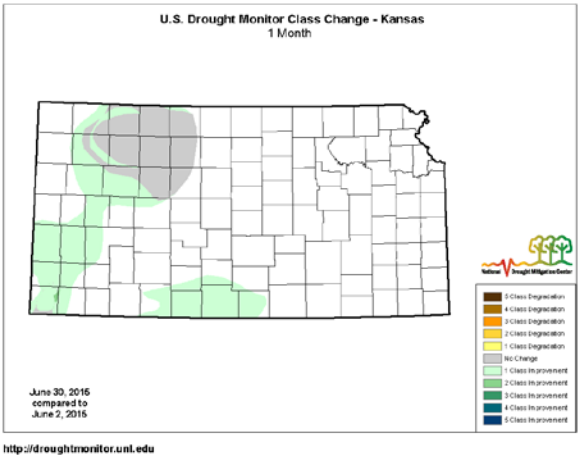
Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

General Conditions

Drought conditions continued to improve slightly as the wet end to May and wet start to June were included in the assessments. The only remaining moderate drought area is in Northwest and North Central KS, with a small area of abnormally dry conditions in the Southwest. Thirty seven counties in western Kansas remain in drought watch status according to the latest advisory from the Kansas Water Office. A return to normal or above normal precipitation is needed to sustain improvements. Some long-term hydrological deficits are in place affecting some water supplies and reservoirs. For example, Norton, Cedar Bluff, Kirwin and Webster reservoirs are all less than 75 percent of conservation pool.

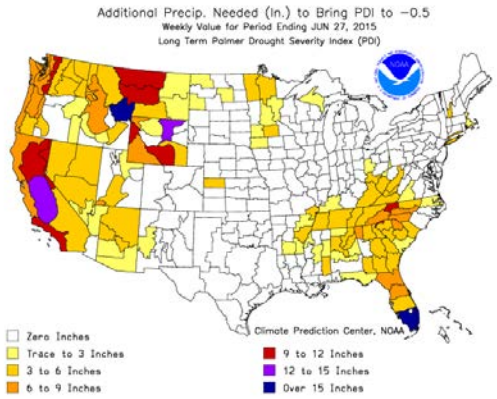




More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought.



Climate Division	Precipitation needed to End Drought (inches)				
	Week ending June 6	Week ending June 13	Week ending June 20	Week ending June 27	Week ending July 4
Northwest	-	-	1.61	3.60	-
West Central	-	-	-	-	-
Southwest	-	-	-	-	-
North Central	-	-	-	-	-
Central	-	-	-	-	-
South Central	-	-	-	-	-
Northeast	-	-	-	-	-
East Central	-	-	-	-	-
Southeast	-	-	-	-	-

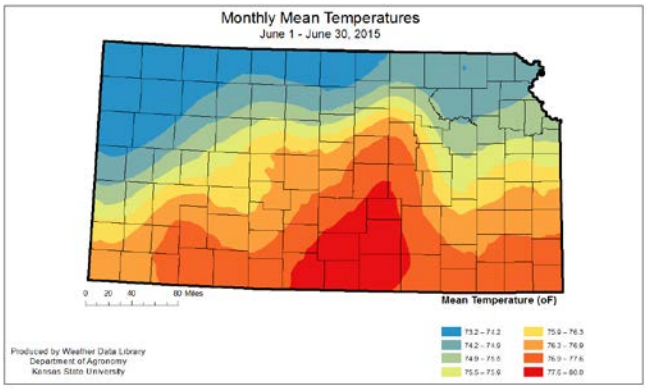
Climate Summary (Temperature and Precipitation)

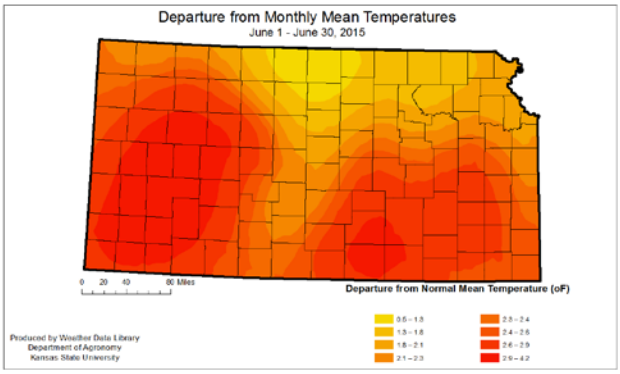
Temperatures averaged warmer than normal for the month. The statewide average temperature was 75.7° F, which is 2.7 degrees warmer than normal. The Southwest Division had the greatest departure with an average of 76.8° F, or 3.6 degrees warmer than normal. The North Central Division was closest to normal with an average of 74.6° F or 1.3 degrees above normal. The warmest reading was 105° F and occurred at two different locations and dates: Norton Dam (Norton County) on the 25th and Hill City (Graham County) on the 30th. This rapid switch from cool wet conditions to warm dry conditions have had mixed impacts. The dry weather allowed for rapid progress on wheat harvest and for field work such as haying. On the other hand, the warm temperatures stressed spring planted crops such as corn and soybeans that had limited root development. Despite the warmer than average conditions, there were only eight (8) new records set for high daily maximums. Most of the warmth was seen in new records on the low temperature side. There were 26 new daily records set for warm low temperatures and 21 records tied. There was one new record for a June daily warm low temperature: Garden City Experiment Station with a low of 75° F on June 22nd. Previous record was 74° F set on June 21, 1989.

The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

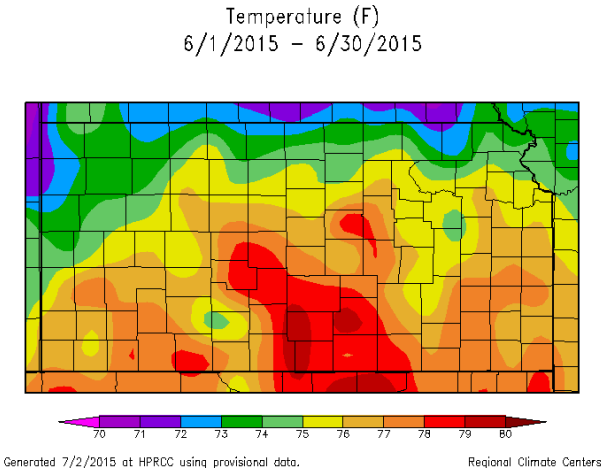
	Kansas Climate Division Temperature Summary (°F)							
	June 2015							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	87.0	59.8	73.4	2.5	105	25	41	1
West Central	88.5	60.7	74.6	2.9	103	22	41	1
Southwest	89.9	63.8	76.8	3.4	104	23	48	1
North Central	86.5	62.8	74.6	1.3	103	25	45	1
Central	89.0	64.4	76.7	2.3	104	22	47	1
South Central	89.6	66.0	77.8	2.8	100	21	45	1
Northeast	84.6	64.7	74.7	1.8	99	21	51	2
East Central	85.3	65.8	75.5	2.3	99	21	52	1
Southeast	86.3	67.2	76.8	2.5	98	29	51	1
STATE	87.4	63.9	75.7	2.4	105	25th	41	1st
Data Source: KSU Weather Library								

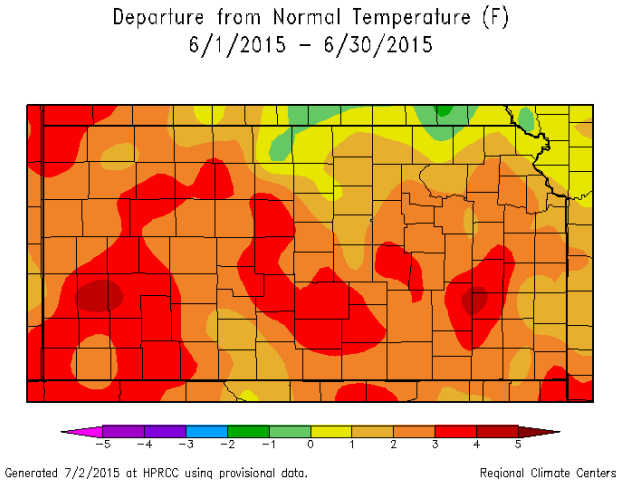
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.



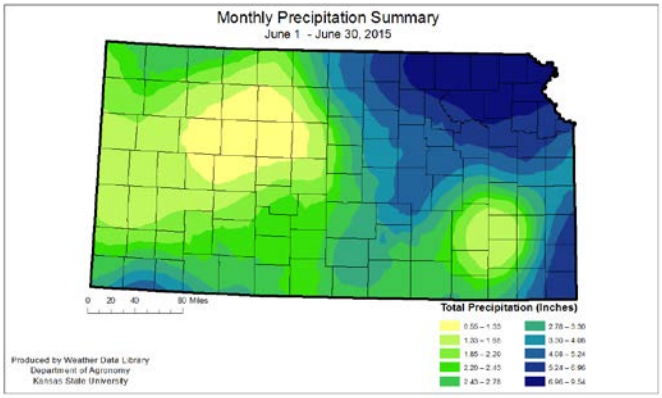


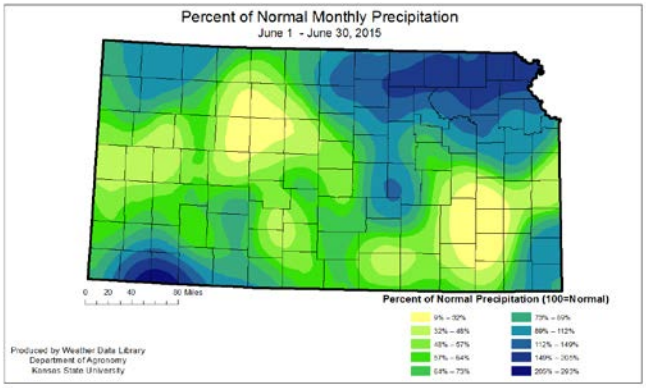
While June began on a wet note, most of the state saw lower than average precipitation for the month. State-wide average precipitation was 3.03 inches or 69 percent of normal. This ranks as the 33rd driest June on record. Only the Northeastern Division averaged above normal. The average precipitation for the Northeast was 6.94 inches or 134 percent of normal. Despite the overall lower than average precipitation, two locations in Southwest KS set daily precipitation records for June: Hugoton (Stevens County) with 3.90 inches on the 11th and Liberal (Stevens County with 5.00 inches on the 12th. The greatest monthly total for the month was 10.46 inches at Bremen, Marshall County (NWS) and 9.54 inches at Blue Rapids 0.2 WSW, (Marshall County (CoCoRaHS).

Kansas Climate Division Precipitation Summary (inches)
Summary June 2015

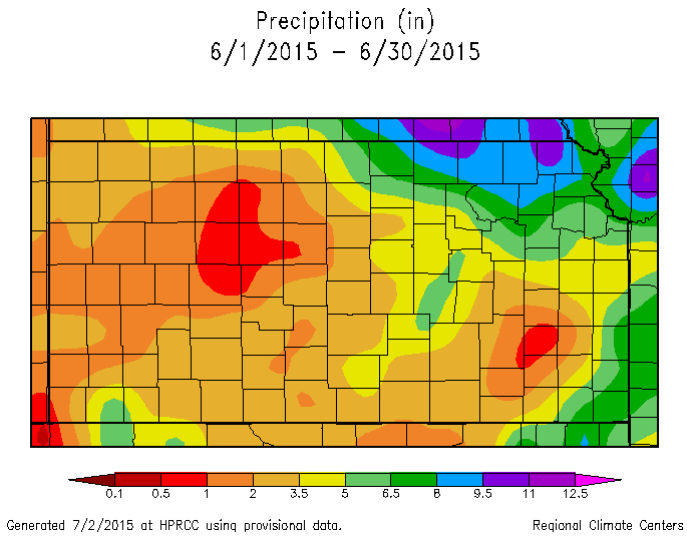
Climate Division	June 1-30, 2015			January 1 – June 30, 2015			April 1 – June 30, 2015			September 1 – June 30, 2015		
	Actual	Depart [1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	1.66	-1.17	57	9.82	-0.85	92	9.26	0.89	111	12.92	-2.22	86
West Central	1.07	-1.74	37	10.29	0.04	100	9.41	1.66	122	14.27	-0.45	97
Southwest	2.79	-0.42	85	13.81	3.85	136	12.00	4.42	155	18.72	4.30	128
North Central	3.63	-0.20	89	13.06	-0.84	91	11.73	1.30	109	18.47	-2.16	87
Central	2.67	-1.41	62	13.90	-1.07	91	12.41	1.40	111	21.86	0.08	100
South Central	2.63	-2.16	55	17.48	0.98	106	15.84	3.96	133	23.16	-1.19	95
Northeast	6.96	1.82	134	19.88	2.49	114	17.68	4.50	134	29.21	2.48	109
East Central	3.82	-1.76	68	18.72	-0.49	96	16.58	2.29	115	28.91	-0.61	96
Southeast	3.04	-2.90	51	19.59	-2.01	90	17.55	1.94	112	32.21	-1.48	95
STATE	3.03	-1.23	69	15.23	0.29	102	13.65	2.55	123	22.24	-0.09	99

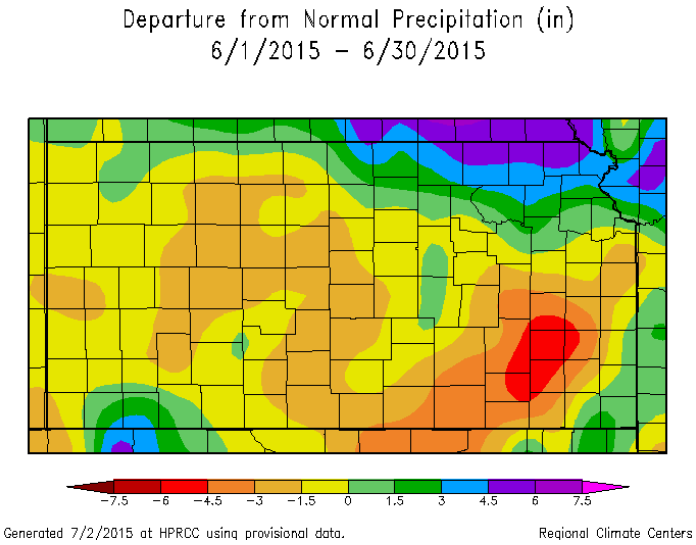
Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

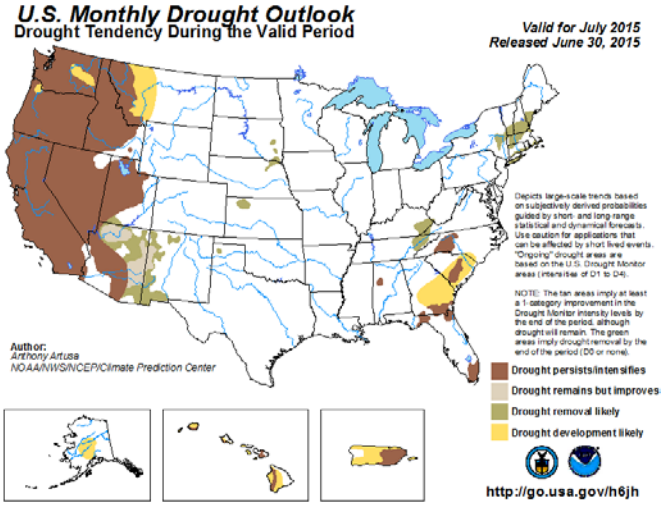


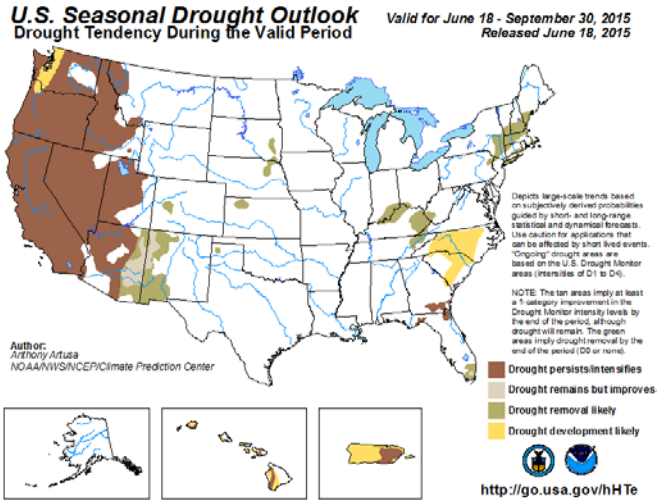


The severe weather activity was less than last month. Preliminary data indicates there were 15 tornadoes reported during June, compared to 99 in the May. Hail reports were also fewer with 83 in June versus 108 in May. There was an increase in damaging wind reports with 65 reports this month and only 52 reports last month.

Future Outlook

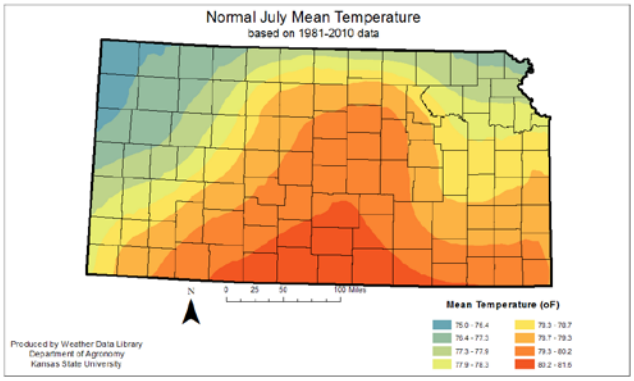
The Drought Outlook for the month of July indicates drought conditions are likely to be removed from the two remaining areas in Kansas, as it did for the month of June. The Season Outlook for Mid-June through the end of September indicates drought removal is likely from the remaining drought affected area in northwest Kansas.

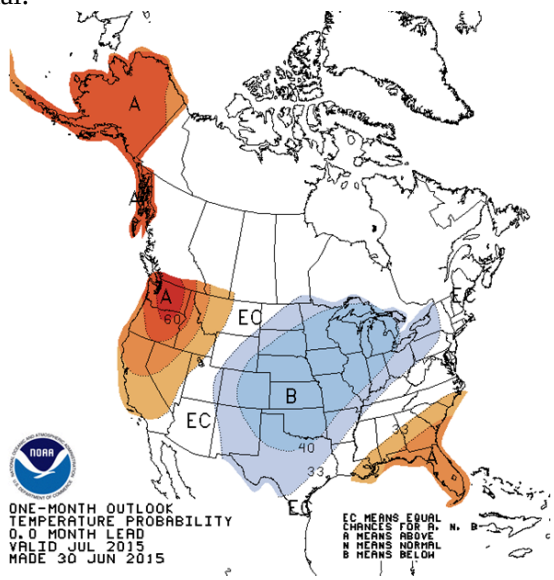


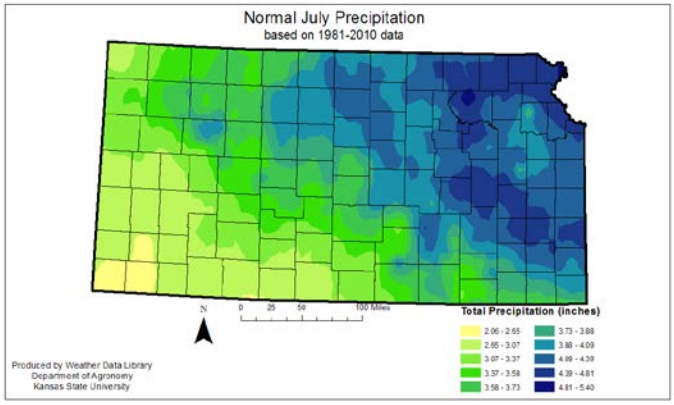


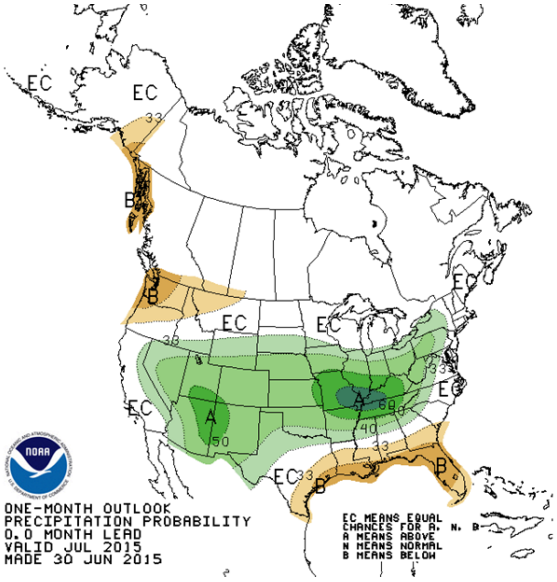
The June temperature outlook calls for greater chances of normal temperatures for most of the state. The June precipitation outlook is for wetter than normal conditions state-wide, as is the outlook for the summer.

July outlook and normal Kansas July temperatures and precipitation are compared below. Below normal temperatures are favored for July. Precipitation is favored to be above normal.

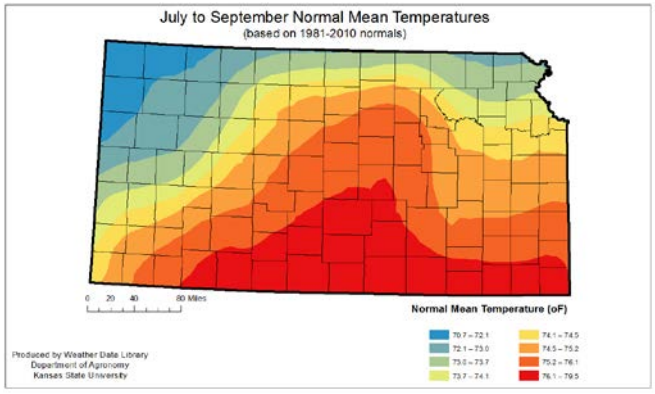


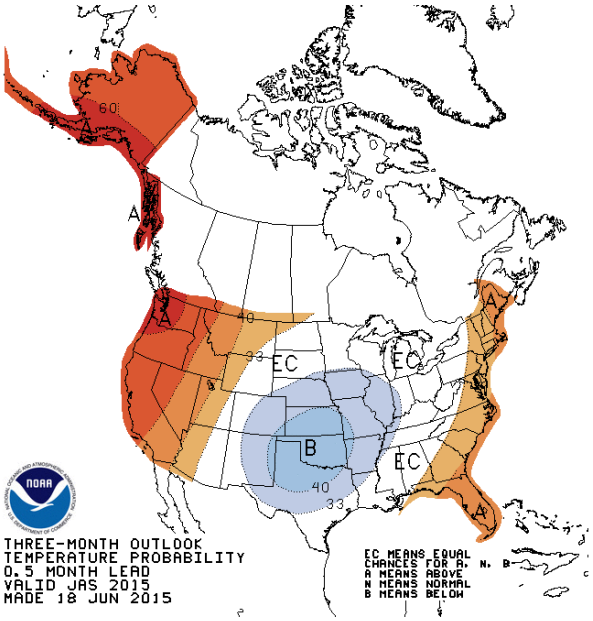


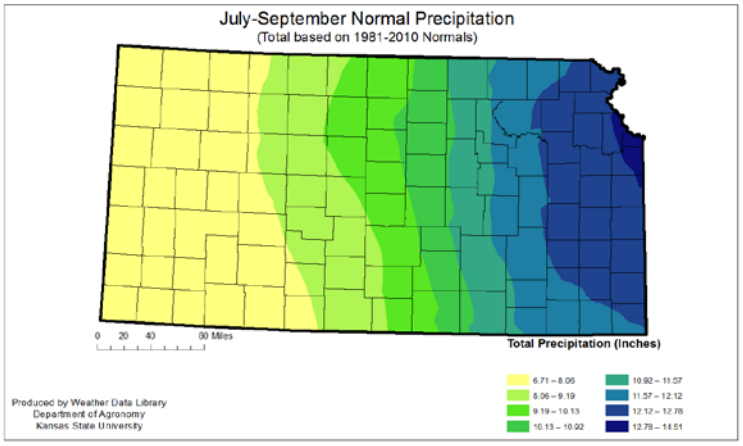


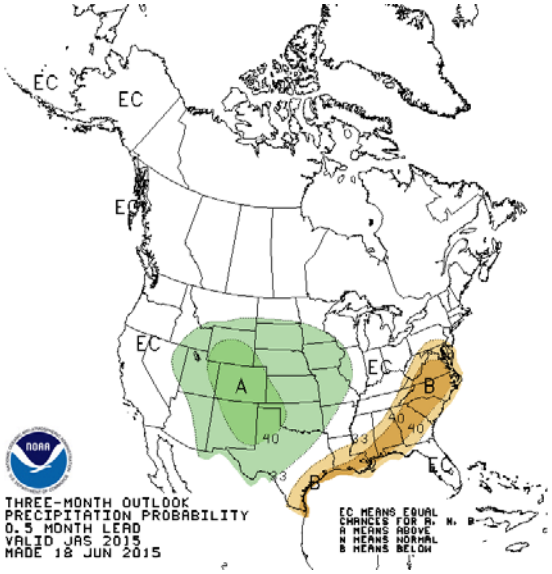


The summer (three-month) outlook favors below normal temperatures and above normal precipitation for July through September.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Effective Monday, June 29, 2015 mandatory Stage III water restrictions are in place for **Russell** water customers.
The flow in Big Creek has been steadily declining the past few weeks. The recent small rains have not been sufficient to maintain Big Creek's levels. This includes a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Surface Water Supply Conditions

The conservation pool at the water supply reservoirs in eastern Kansas are full, discharges of excess for flood protection occurring. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool at 45% or less. Wilson reservoir is relatively low at only 70% of conservation pool.

Kansas River basin: Milford, Tuttle Creek, Perry, and Clinton reservoirs all received significant amounts of inflow in the month of June. All reservoirs were in flood pool operations throughout the month.

Marais des Cygnes basin: Pomona, Melvern, and Hillsdale reservoirs began June with a healthy amount of flood storage occupied. After one moderate inflow event early in the month, flood storage was released and reservoirs levels were drawn down to near normal pool elevations.

Cottonwood / Neosho basin: Council Grove, Marion, and John Redmond reservoirs were all operated for maximum flood control of waters in the Neosho River (Kansas and Oklahoma). All reservoirs maintained a significant amount of flood storage throughout the month.

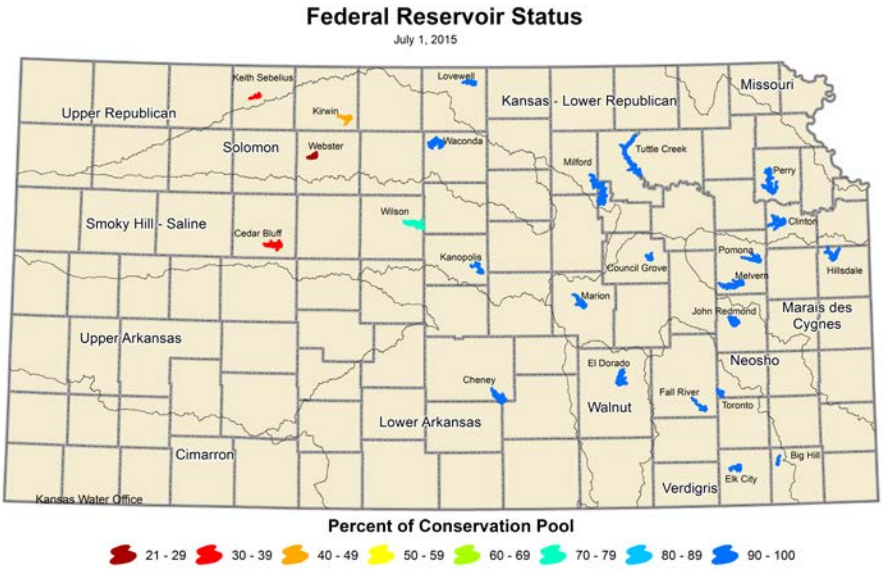
Verdigris basin: Toronto, Fall River, and Elk City reservoirs were all operated for maximum flood control of waters in the Verdigris River (Kansas and Oklahoma). All reservoirs maintained a significant amount of flood storage throughout the month.

Saline basin: Wilson Lake reached new record low levels in the month of June, approaching 9 feet below the top of the multipurpose pool elevation. Recreation is significantly impacted and the Wilson Lake community has asked for

help. The KWO has asked the U.S. Army Corps of Engineers for a reduced minimum release to help mitigate some of the impacts from drought. Reducing the release will not stop the lake level from declining, due to the lack of inflow, but it is the only action that can make any difference. The Corps of Engineers is evaluating the request.

Smoky Hill basin: The majority of the Smoky Hill basin was dry, relative to the eastern portion of the state in June. Kanopolis Reservoir began the month with healthy storage, from good inflows in May but June inflows were moderate to low. However, the pool remained above conservation elevation and water is discharging through the uncontrolled notch. Downstream flow was around the historical median throughout the month at the USGS gage at Mentor. Cedar Bluff Reservoir's lack of inflow reflects the drier Upper Smoky Hill basin and a net water level decline for the month.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

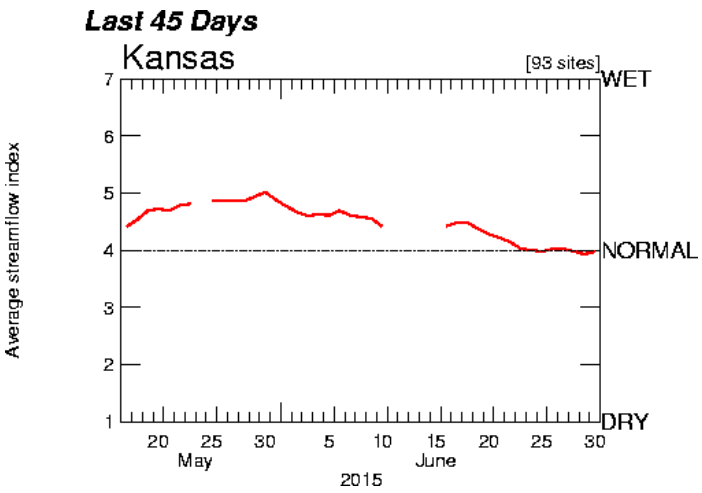
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**07/01/2015 06:00 AM**		
Norton[1]	2304.3	2288.57	-15.73	29.6
Harlan County, NE	1945.73	1936.23	-9.50	64.0
Lovewell[1]	1582.6	1584.13	1.53	100.0
Milford[1]	1144.4	1148.11	3.71	100.0
Cedar Bluff	2144	2120.82	-23.18	35.1
Kanopolis[1]	1463	1466.30	3.30	100.0
Wilson[1]	1516	1507.17	-8.83	70.2
Webster[1]	1892.5	1871.04	-21.41	24.9
Kirwin[1]	1729.3	1715.88	-13.37	44.6
Waconda[1]	1455.6	1454.99	-0.61	96.5
Tuttle Creek[1]	1075	1099.18	24.18	100.0
Perry[1]	891.5	895.57	4.07	100.0
Clinton[1]	875.5	877.29	1.79	100.0
Melvern[1]	1036	1036.47	0.47	100.0
Pomona[1]	974	975.07	1.07	100.0
Hillsdale[1]	917	917.84	0.84	100.0
Arkansas River Basin		**07/01/2015 08:00 AM**		
Cheney	1421.6	1423.05	1.45	100.0
El Dorado	1339	1342.11	3.11	100.0
Toronto[1]	901.5	916.36	14.86	100.0
Fall River[1]	948.5	968.43	19.93	100.0
Elk City[1]	796	810.26	14.26	100.0
Big Hill	858	858.05	0.05	100.0
Council Grove[1]	1274	1281.12	7.12	100.0
Marion[1]	1350.5	1353.14	2.64	100.0
John Redmond[1]	1039	1056.36	15.36	100.0

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

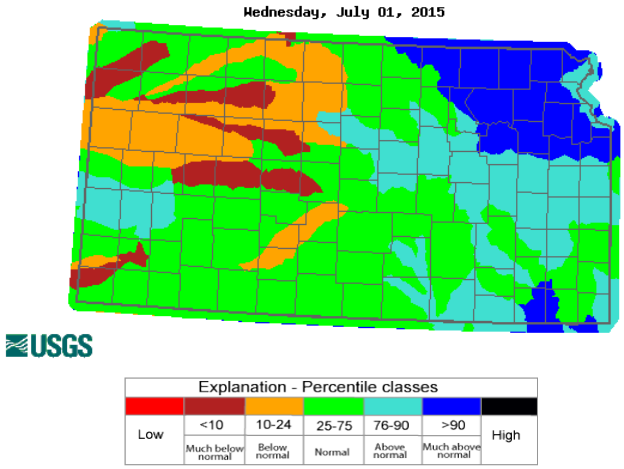
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

Streamflow Conditions

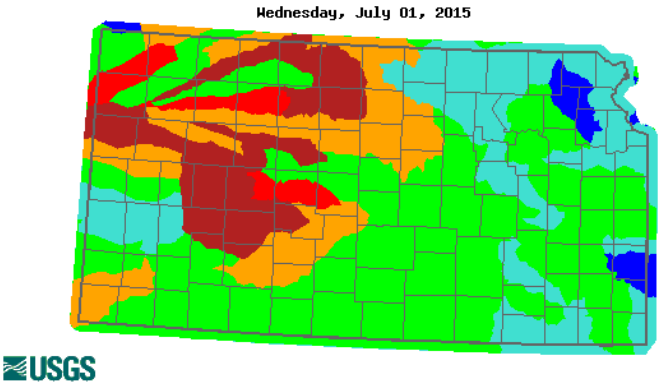
Kansas streamflows during June, improved further generally, but deteriorated in west and central Kansas by the end of the month. The graph below left provides an overview of streamflow for the state.



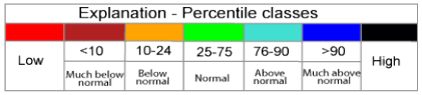
The comparison of present **28-day** streamflow to historical is shown on the map below, right.



The comparison of present **7-day** streamflow to historical is shown on the map below left.



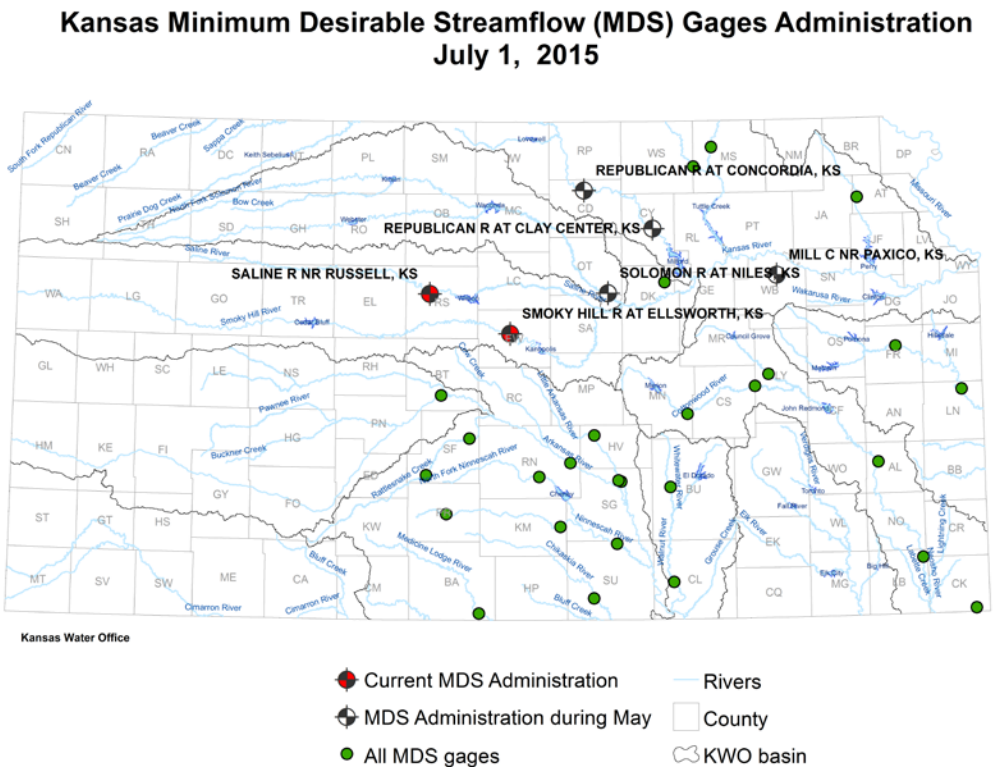
In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

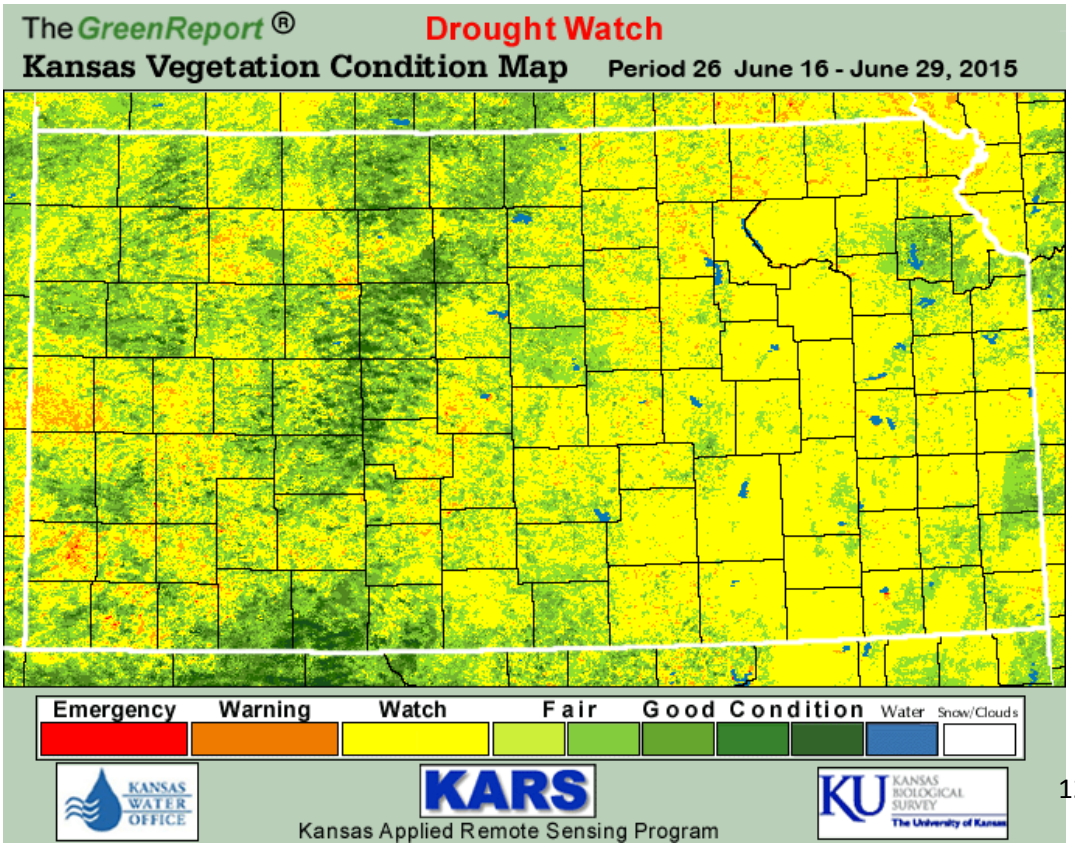
Streamflows in cubic feet per second (cfs)								
Gaging Station	**Flow June 4**	**Flow June 11**	**Flow June 18**	**Flow June 25**	**June MDS**	**July MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	429	2670	1260	426	150	150	03/20/15; ceased 05/29/15	
Republican River at Clay Center	716	1620	2620	806	250	200	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	67	36	29	18	45	35	03/23/15	3
Saline River near Russell	10	6	5	2	12	2	10/22/2014	9
Solomon River at Niles	354	-	-	88	90	50	03/23/15; ceased 05/28/15	
Medicine Lodge River near Kiowa	-	-	-	33	35	6		

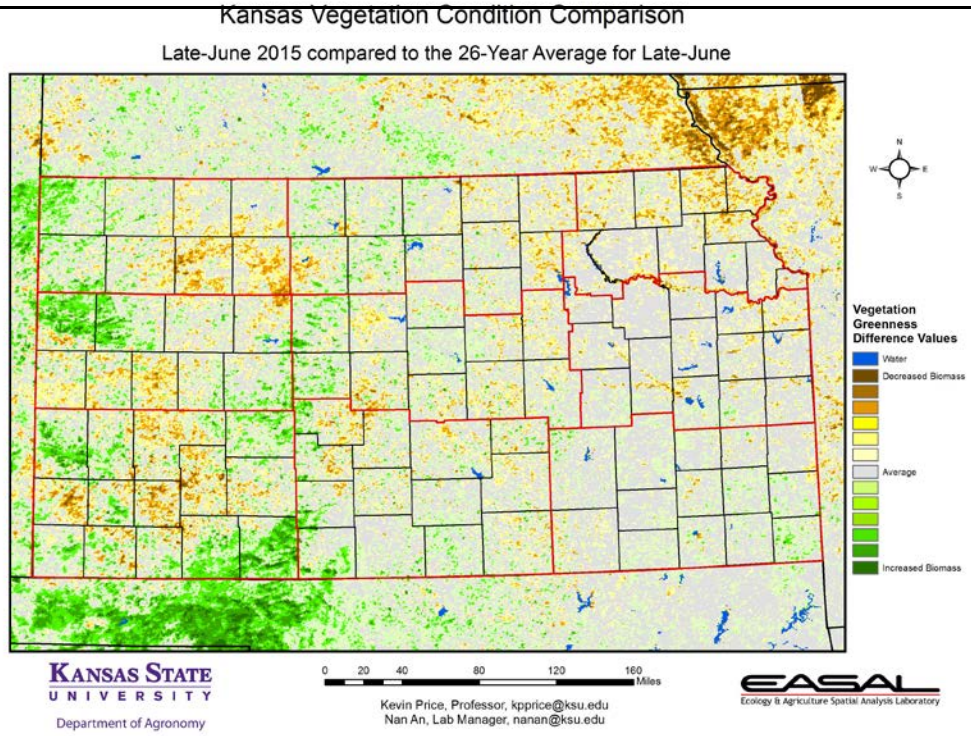


Soil, Crop and Vegetation

Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. In general, the state is in pretty good shape. Pockets of dryness are still present in the south west. However, the center of the state has lost it's great conditions of the previous weeks.



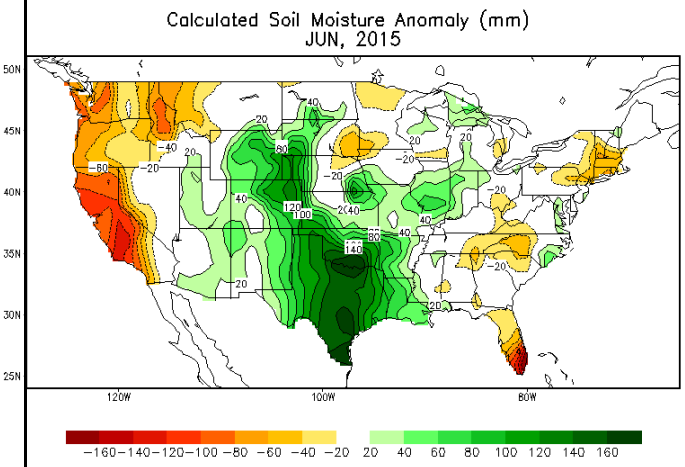


Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for June 16-June 29 (late June) from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state has fairly average photosynthetic activity. The western divisions have the greatest increase over normal photosynthetic activity. While precipitation in this region is above normal, it has not been quite as excessive as in the Northeastern Division, so has not been limiting. Lower NDVI values are seen in Sheridan and Graham counties, where moderate drought persists. In contrast, the lower NDVI values in Brown and Doniphan counties are due to continued higher than normal precipitation.

Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology.

http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml



Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending June 28, 2015 reported topsoil moisture rated 2 percent very short, 14 short, 77 adequate, and 7 surplus. Subsoil moisture rated 5 percent very short, 15 short, 76 adequate, and 4 surplus.

Field Crops: Winter wheat condition rated 10 percent very poor, 19 poor, 39 fair, 29 good, and 3 excellent. Winter wheat coloring was at 97 percent, near 96 last year and 98 for the five-year average. Mature rated 84 percent, near 81 last year and 86 average. Harvested was 48 percent, ahead of 38 last year, but behind 60 average.

Corn condition rated 2 percent very poor, 8 poor, 34 fair, 50 good, and 6 excellent. Corn emerged was 96 percent, behind 100 last year and average. Silking was at 14 percent, near 17 last year and 15 average.

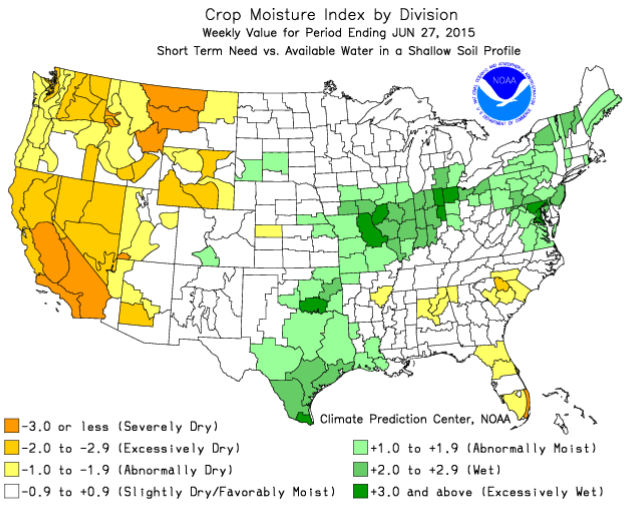
Soybeans condition rated 1 percent very poor, 7 poor, 43 fair, 46 good, and 3 excellent. Soybeans planted was at 86 percent, behind 93 last year and 96 average. Emerged was 71 percent, behind 88 last year and 90 average. Blooming was 2 percent, near 4 last year and 5 average.

Sorghum condition rated 0 percent very poor, 1 poor, 28 fair, 68 good, and 3 excellent. Sorghum planted was 92 percent, near 90 last year and 94 average. Emerged was 75 percent, ahead of 69 last year, but near 79 average.

Sunflowers condition rated 0 very poor, 1 poor, 29 fair, 62 good, and 8 excellent. Sunflowers planted was 81 percent, near 82 last year and 83 average. Emerged was 62 percent, near 65 last year, but behind 67 average.

Alfalfa hay conditions rated 1 percent very poor, 4 poor, 27 fair, 63 good, and 5 excellent. Alfalfa hay first cutting was 95 percent complete, near 98 last year and 99 average. Second cutting was 29 percent, behind 37 last year and well behind 50 average.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 1 very poor, 5 poor, 26 fair, 56 good, and 12 excellent. Stock water supplies rated 2 percent very short, 7 short, 86 adequate, and 5 surplus. (http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)



The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.

Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

June 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	2.91	0.03	101%	71.8	3.2	95 (30	53 (1)
Dodge City	2.08	-1.16	64%	76.6	2.7	100 (22)	57 (27, 1)
Garden City	2.55	-0.93	73%	76.4	3.7	98 (21,20)	55 (1)
Goodland	2.31	-0.94	71%	72.7	3.0	95 (30,19)	54 (27, 1)
Guymon, OK	1.69	-1.25	57%	77.4	3.3	99 (22)	59 (30,8)
Hill City	0.78	-1.98	28%	76.3	3.4	105 (30)	55 (27)
Lamar, CO	2.38	0.03	101%	74.7	3.1	102 (24)	51 (3,1)
McCook, NE	4.52	1.14	134%	73.6	3.7	101 (30)	54 (1)
Springfield, CO	0.86	-1.64	34%	73.0	1.7	100 (22,21)	51 (8,7)
Central							
Concordia	6.11	2.06	151%	74.9	1.5	98 (20)	53 (1)
Hebron, NE	8.46	3.68	177%	73.4	1.4	97 (24,10)	55 (1)
Medicine Lodge	2.26	-1.85	55%	79.1	2.5	100 (30)	58 (1)
Ponca City, OK	1.62	-3.44	32%	80.4	3.8	99 (30)	54 (1)
Salina	4.50	0.39	109%	79.4	3.8	104 (22)	56 (1)
Wichita (ICT)	2.00	-3.00	40%	80.0	4.2	100 (30)	59 (1)
East							
Bartlesville, OK	7.06	1.69	131%	78.1	1.9	97 (10)	49 (1)
Chanute	2.37	-3.66	39%	77.7	3.1	95 (25,10)	57 (2)
Fall City, NE	10.88	6.00	223%	74.1	0.8	97 (20,10)	54 (2,1)
Johnson Co. Exec. Apt	6.19	0.41	107%	76.2	2.8	95 (25,20)	56 (2)
Joplin, MO	7.67	1.81	131%	77.6	2.1	92 (25,24)	55 (2)
Kansas City (MCI), MO	7.58	2.35	145%	74.8	1.3	95 (20)	57 (2,1)
St. Joseph, MO	6.90	2.72	165%	75.2	1.6	99 (20)	57 (1)
Topeka (TOP	6.22	0.82	115%	77.0	2.8	98 (20)	56 (2)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – July 2015 Summary

Climate, Drought Conditions and Responses for Kansas

General

- June 29, 2015, Executive Order (EO) 15-04 issued by Governor for a drought watch for 33 counties.
- The US Drought Monitor indicated dry conditions persist across 32 percent of Kansas.
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, all are due to drought. An additional 14 contiguous counties are also eligible federal for assistance.
- Disaster declaration by the President issued for severe storms, tornados, straight line winds and flooding May 4-June 21, 2015. This makes disaster aid available through Federal Emergency Management Agency (FEMA).

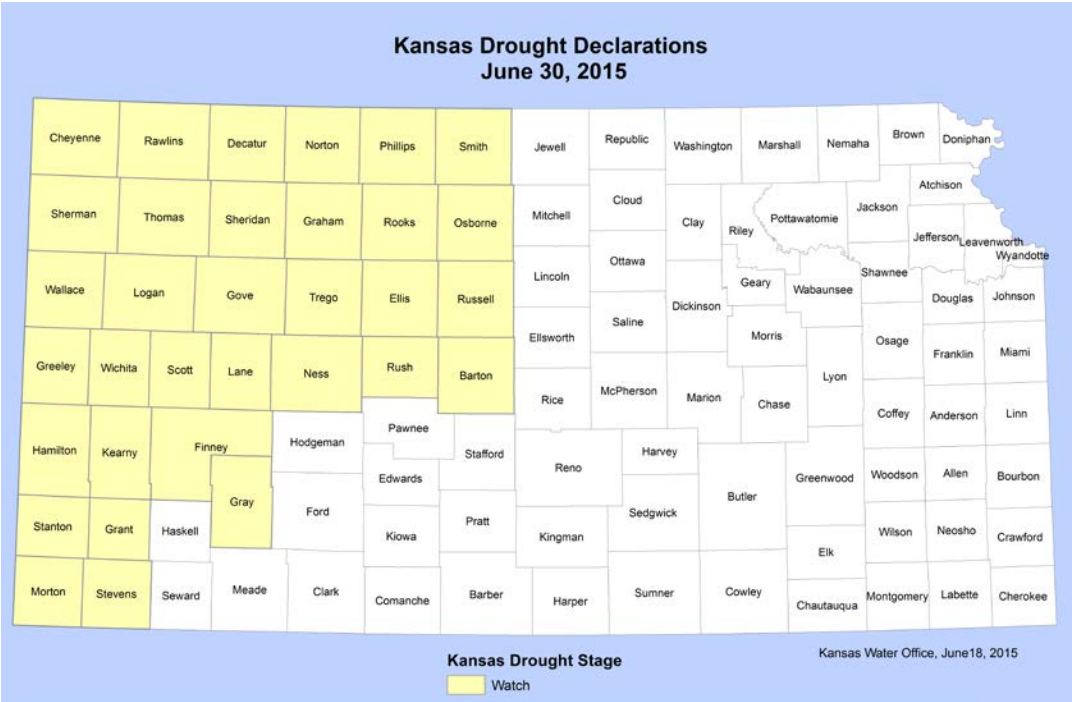
Water Supply

- City of Russell in stage III of water conservation plan beginning July 29, 2015, prohibiting waste of water and placing some restrictions on outdoor water use.

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration was in effect on the Saline and Smoky Hill rivers throughout July. MDS administration ceased on the Saline River July 31, 2015.
- Blue-Green Algae Bloom Warning is in effect for Chisolm Creek Park Lake, Sedgwick County; Memorial Park Lake, Barton County; Milford Reservoir (zones B and C), Clay, Dickinson, Geary counties; and Plainville township Lake, Rooks County (August 4, 2015).
- Blue-Green Algae Bloom Watch is in effect for Sabetha City Lake, Nemaha County; Brown County State Fishing Lake; Lovewell Reservoir, Jewell County; Milford Reservoir (zones A), Geary County (August 4, 2015).

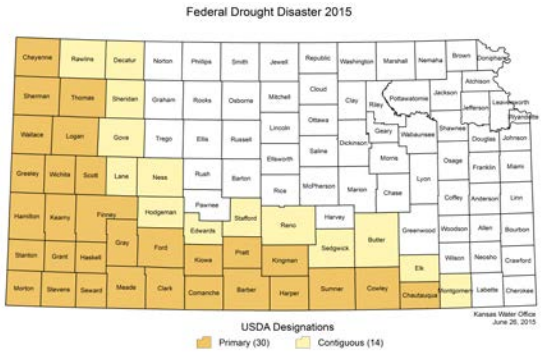
Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.



Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal: USDA has designated 30 Kansas Counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 14contiguous counties are also eligible for natural disaster assistance. These are Butler, Chautauqua, Decatur, Edwards, Elk, Gove, Hodgeman, Lane, Ness, Rawlins, Reno, Sheridan, Stafford, Sumner and Montgomery.



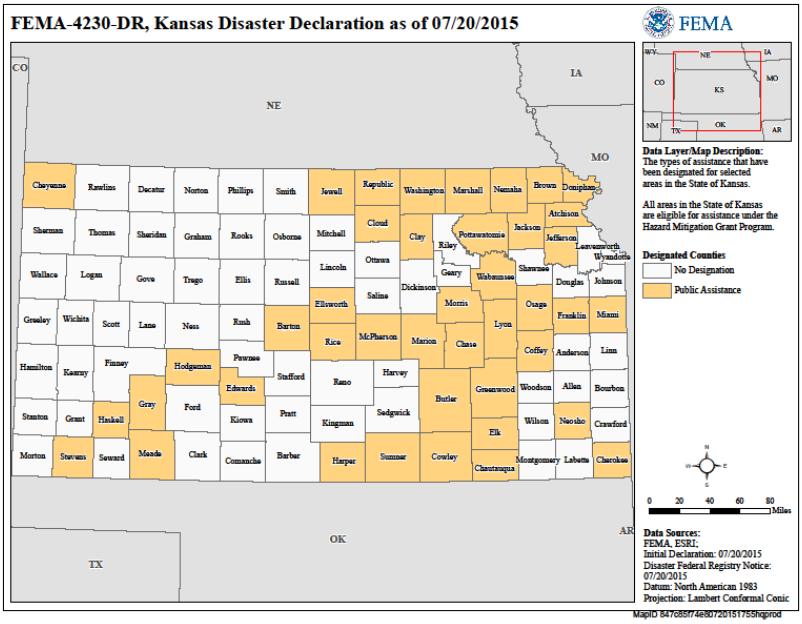
Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

July 20, 2015 the President declared disaster for Kansas areas affected by severe storms, tornadoes, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The President's action makes federal funding available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornadoes, and flooding in the counties of Atchison, Barton, Brown, Butler, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Cowley, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Harper, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Marion, Marshall, McPherson, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Rice, Stevens, Sumner, Wabaunsee, and Washington.

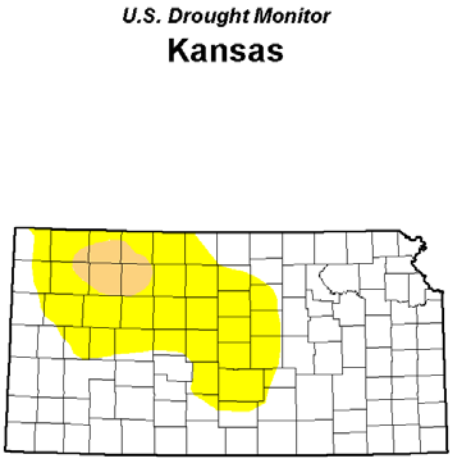


Federal funding is available on a cost-sharing basis for hazard mitigation measures statewide. More information may be found at http://www.fema.gov/news-release/2015/07/20/federal-aid-programs-state-kansas-declaration.

General Conditions

Drought conditions deteriorated slightly, which was not unexpected in portions of the Northwest, North Central and Central climate divisions, where rainfall for July was less than normal. The only remaining moderate drought area is in Northwest and North Central Kansas, with an expanding area of abnormally dry conditions in the Central climate division. A return to normal or above normal precipitation is needed to sustain improvements. Some long-term hydrological deficits are in place affecting some western reservoirs.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.



July 28, 2015
(Released Thursday, Jul. 30, 2015)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

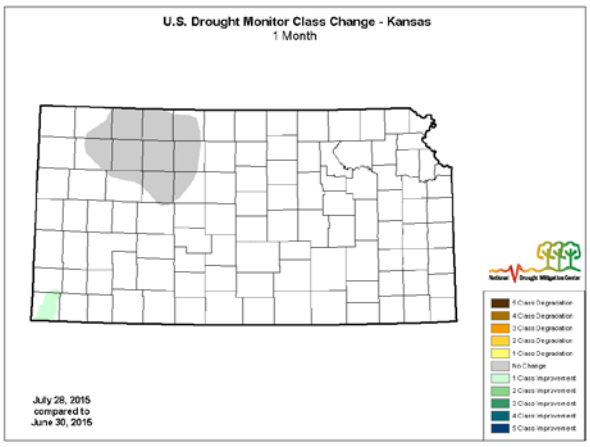
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	68.33	31.67	3.49	0.00	0.00	0.00
Last Week 7/21/2015	78.21	21.79	3.49	0.00	0.00	0.00
3 Months Ago 4/28/2015	8.01	91.99	67.89	26.18	3.17	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 7/29/2014	1.78	98.22	85.42	33.55	8.93	0.00

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

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

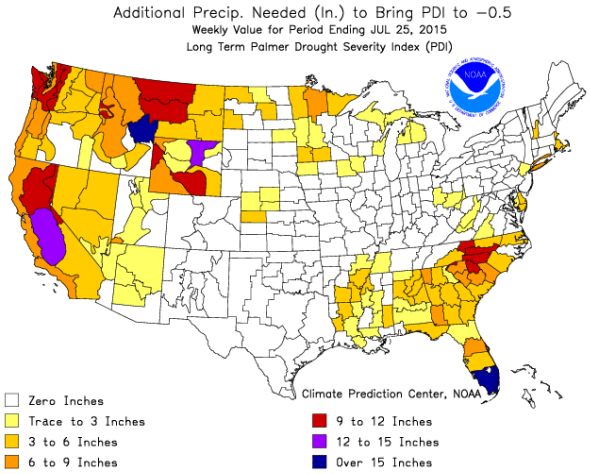
Author:
Richard Heim
NCEI/NOAA

http://droughtmonitor.unl.edu/



Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought.



Climate Division	Precipitation needed to End Drought (inches)			
	Week ending July 4	Week ending July 11	Week ending July 18	Week ending July 25
Northwest	6.06	6.37	5.14	4.99
West Central	-	0.99	-	-
Southwest	-	-	-	-
North Central	-	-	-	-
Central	-	-	-	-
South Central	-	-	-	-
Northeast	-	-	-	-
East Central	-	-	-	-
Southeast	-	-	-	-

Climate Summary (Temperature and Precipitation)

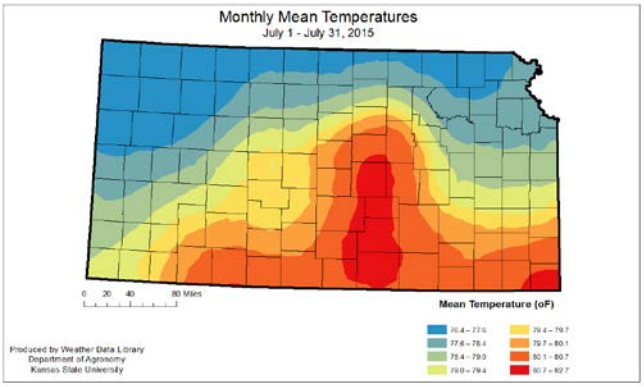
There were swings in both temperature and precipitation, but overall July was very close to normal. The state-wide average temperature was 78.8°F, just 0.1 degree warmer than normal for the month. There were no new record high temperatures set, and only 4 records tied during the month. In contrast, there were 84 new record cold high temperatures,

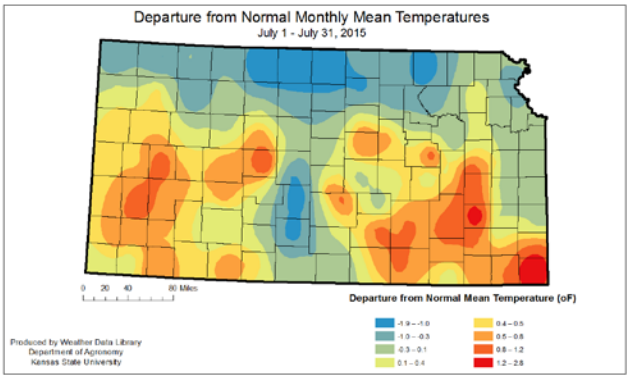
and 22 records that tied. On the low temperature side, the opposite prevailed with 16 new record warm low temperatures and 22 records tied. There was one new record low temperature for the month: 41°F at Hoxie (Sheridan County) on the 28th. Not surprisingly, that was also the coldest reading across the state during July. The Southeast Division was the warmest, with an average of 80.0°F, or 0.7 degrees warmer than normal. In contrast, the North Central Division was the coolest with an average of 78.4°F, or -0.6 degrees cooler than normal. The Northeastern Division averaged 77.9°F, exactly normal. The warmest reading was 108 °F and occurred at two different locations and dates: Lakin (Kearny County) on the 14th and Abilene 1W (Dickinson County) on the 24th. The coolest reading for the state was 41°F at Hoxie (Sheridan County) on the 28th. While the temperatures weren't particularly outside of the normal range, late-planted spring crops such as corn and soybeans that had limited root development, continue to show stress.

The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

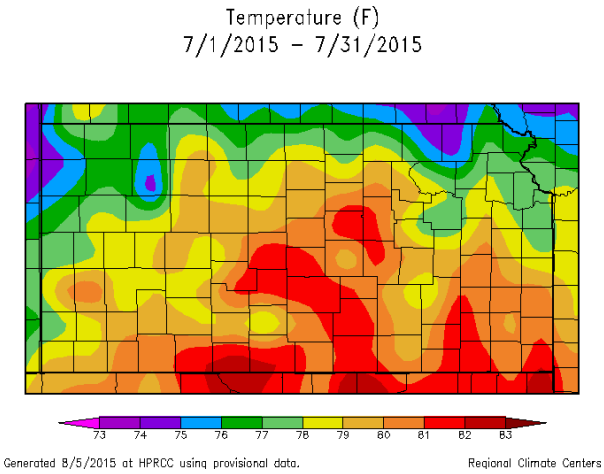
	Kansas Climate Division Temperature Summary (°F)							
	July 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	91.0	61.8	76.4	-0.4	107	25	41	28
West Central	92.0	63.5	77.8	0.4	105	13	49	8
Southwest	92.4	66.3	79.4	0.5	108	14	49	8
North Central	90.7	66.1	78.4	-0.6	106	25	51	8
Central	92.4	67.8	80.1	0.2	108	24	50	8
South Central	91.8	69.2	80.5	0.1	107	14	57	8
Northeast	87.5	68.2	77.9	0.0	101	25	56	4
East Central	88.3	68.8	78.6	0.2	101	25	57	4
Southeast	89.0	71.0	80.0	0.7	100	25	60	4
STATE	90.6	67.0	78.8	0.1	108	24th	41	28th
Data Source: KSU Weather Library								

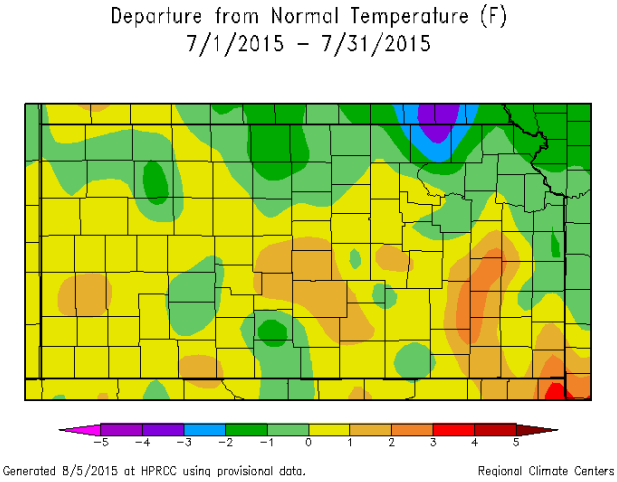
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.

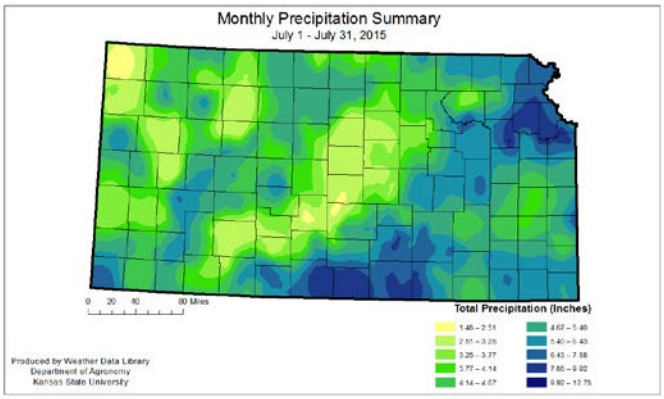


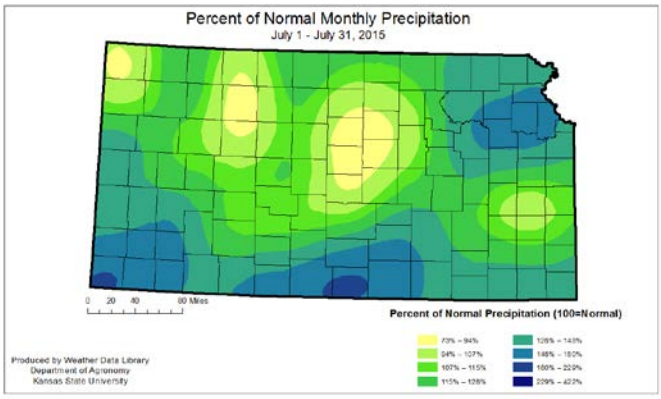


Average precipitation was 4.61 inches or 125 percent of normal. The Northwest division of the state saw the lowest average precipitation at 3.07 inches or 84 percent of normal. The other divisions with below normal precipitation were the North Central and Central divisions. In the Central Division, the average was 3.76 inches or 95 percent of normal, while the North Central Division averaged 4.10 inches or 98 percent of normal. Both the Southwest and South Central divisions had the same percent of normal, 176 percent, but the average precipitation was quite different. The Southwest division averaged 4.65 inches while the South Central division average 6.02 inches. This ranks as the 25th wettest July on record. The greatest monthly precipitation was 13.80 inches at Sun City 6S, Barber County (NWS) and 12.78 at Topeka 5.5 SE. Shawnee County (CoCoRaHS). While 71 new daily precipitation records were set, none of these were new records for July.

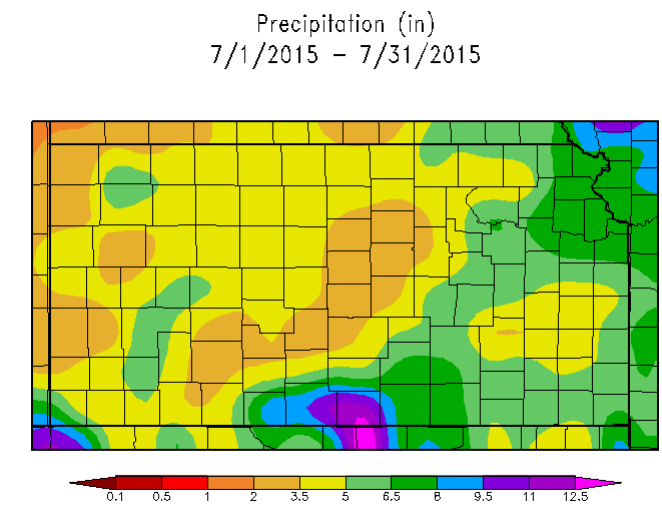
Kansas Climate Division Precipitation Summary (inches) - Summary June 2015												
Climate Division	July 1-31, 2015			January 1 – July 31, 2015			April 1 – July 31, 2015			September 1 – July 31, 2015		
	Actual	Depart [1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal	Actual	Depart[1] Normal	Percent Normal
Northwest	3.07	-0.42	86	13.13	-1.03	93	12.57	0.71	106	16.22	-2.41	87
West Central	3.67	0.23	108	14.05	0.36	103	13.17	1.98	118	17.88	-0.28	98
Southwest	4.65	1.88	173	18.34	5.61	143	16.53	6.18	159	23.24	6.05	134
North Central	4.10	-0.01	98	17.33	-0.68	94	16.01	1.47	108	22.21	-2.52	88
Central	3.76	-0.18	95	17.66	-1.25	92	16.17	1.21	107	23.9	-1.82	92
South Central	6.02	2.49	173	23.42	3.39	117	21.78	6.37	141	29.06	1.18	104
Northeast	6.08	1.70	138	26.01	4.24	119	23.81	6.25	135	34.22	3.12	109
East Central	4.88	0.58	113	23.65	0.14	99	21.50	2.91	114	32.01	-1.82	93
Southeast	4.97	0.90	123	24.41	-1.26	94	22.37	2.70	113	35.95	-1.81	94
STATE	4.61	0.88	126	19.85	1.18	107	18.27	3.44	123	26.18	0.12	101

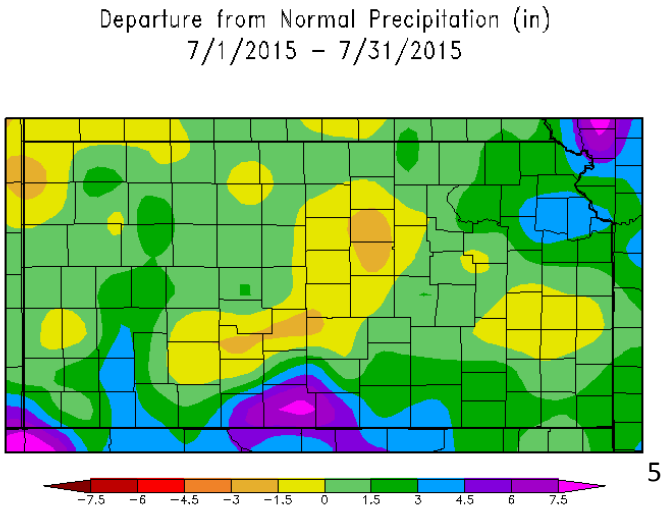
Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

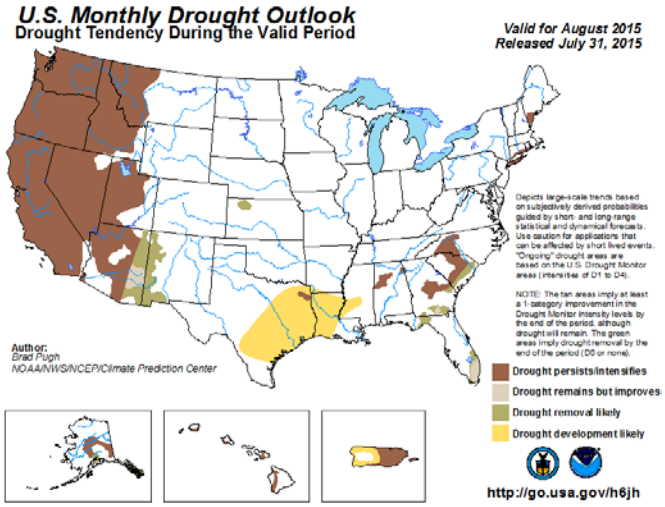


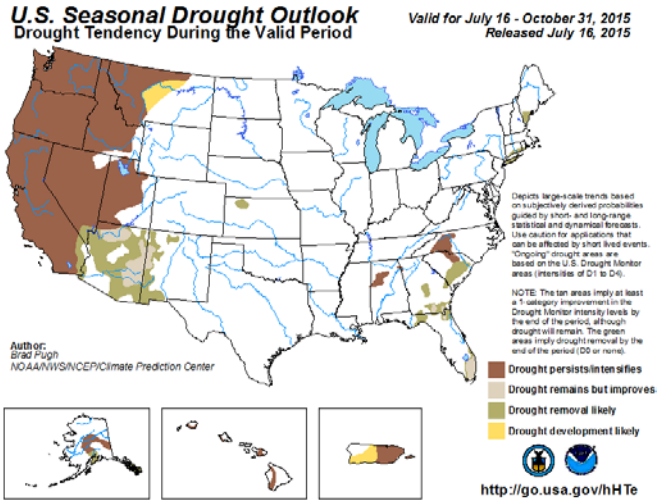


The severe weather activity was less than last month. Tornado activity continued to decline. Preliminary data indicates there were 7 tornadoes, compared to 15 tornadoes reported during June and 99 in May. Hail reports were also fewer with 55 reports this month versus 83 in June and 108 in May. There was an increase in damaging wind reports with 114 damaging wind reports this monthly, 65 reports in June and only 52 reports last May.

Future Outlook

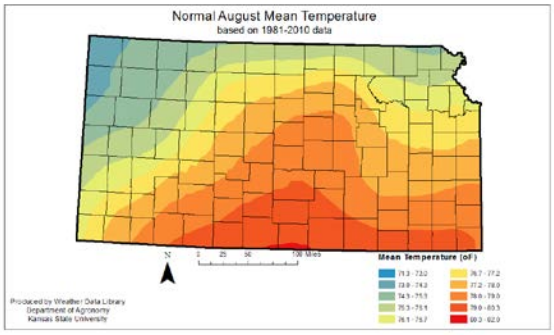
The Drought Outlook for the month of August indicates drought conditions are likely to be removed from the two remaining areas in Kansas, as it did for the month of June and July. The Season Outlook for Mid-July through the end of October indicates drought removal is likely from the remaining drought affected area in northwest Kansas.

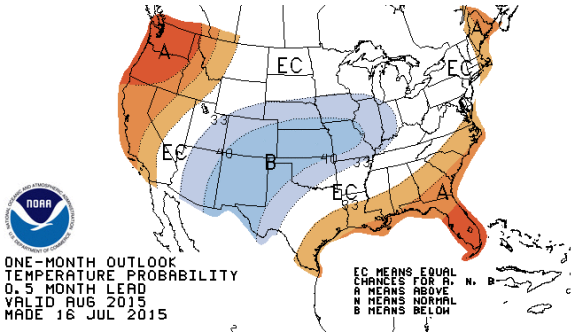


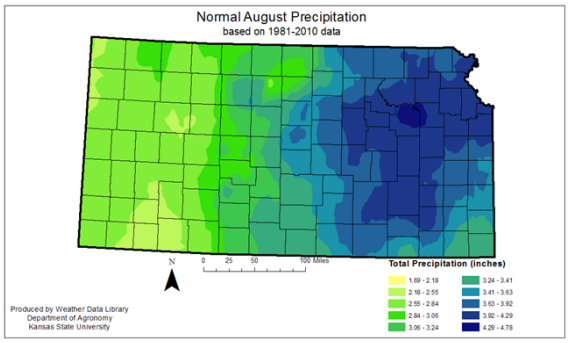


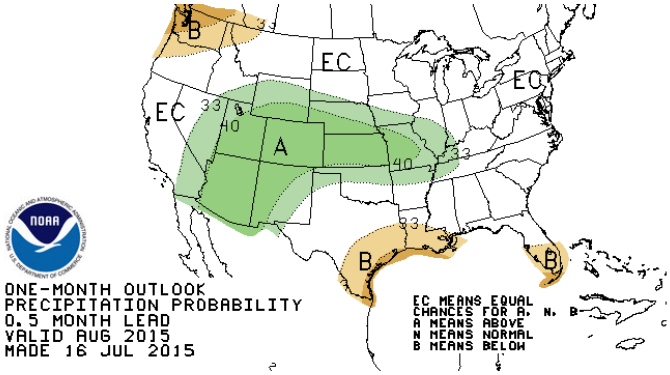
The August temperature outlook calls for greater chances of below normal temperatures for most of the state. The August precipitation outlook is for wetter than normal conditions state-wide, as is the seasonal outlook through October.

Below normal temperatures are favored for August. Precipitation is favored to be above normal. August outlook and normal Kansas August temperatures and precipitation are compared below.

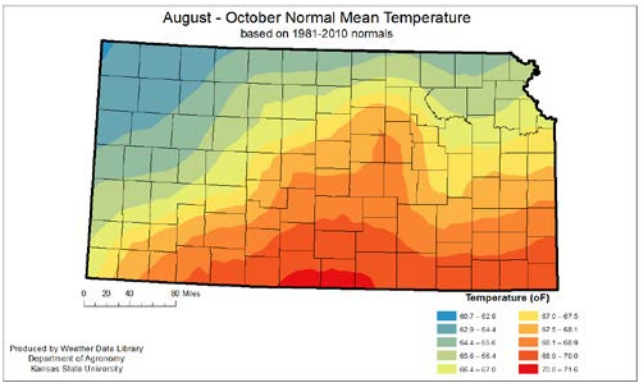


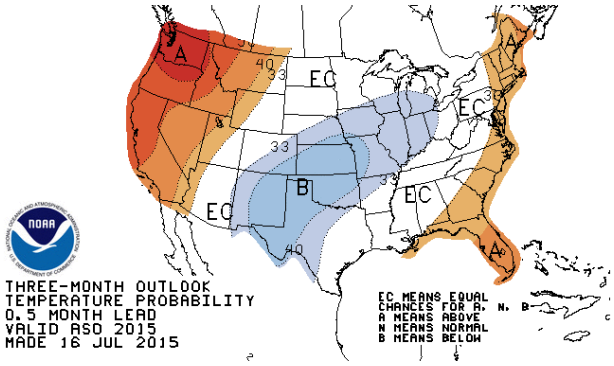


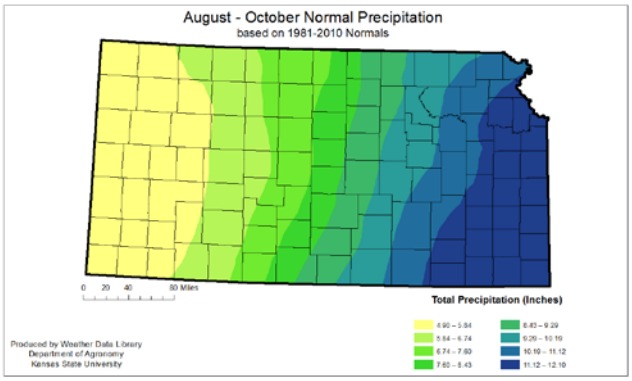


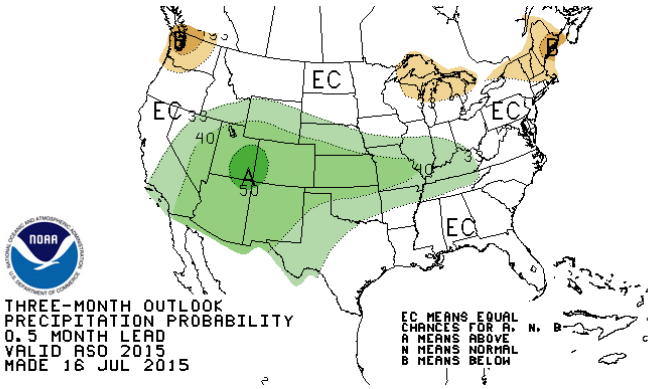


The fall (three-month) outlook favors below normal temperatures and above normal precipitation for August through October.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Effective Monday, June 29, 2015 mandatory Stage III water restrictions are in place for **Russell** water customers. The water restrictions include a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Surface Water Supply Conditions

The conservation pools at the water supply reservoirs in eastern Kansas are full, discharges of excess for flood protection occurring. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool at 42% or less. Wilson reservoir is relatively low at only 69% of conservation pool.

Kansas River basin: Milford, Tuttle Creek, Perry, and Clinton reservoirs all received moderately healthy inflow in the month of July. All reservoirs were in flood pool operations for most the month. Flood storage was evacuated and streamflow in the Kansas River was maintained well above median July flows. Note: Tuttle Creek was drawn down slightly below normal pool to facilitate maintenance work on a gate.

Marais des Cygnes basin: Pomona, Melvern, and Hillsdale reservoirs began July at near normal pool elevations. A few inflow events provided a significant amount of water during the month and flood storage was released as downstream conditions allowed, flood pool operations persisted throughout the month. Flows in the Marais des Cygnes were well above median July flows.

Cottonwood / Neosho basin: Council Grove, Marion, and John Redmond reservoirs were in flood pool operations in July. However, all reservoirs were able to reduce flood storage during the month.

Verdigris basin: Toronto, Fall River, and Elk City reservoirs were in flood pool operations in July. Flood storage was reduced and all reservoirs ended the month near normal pool elevations.

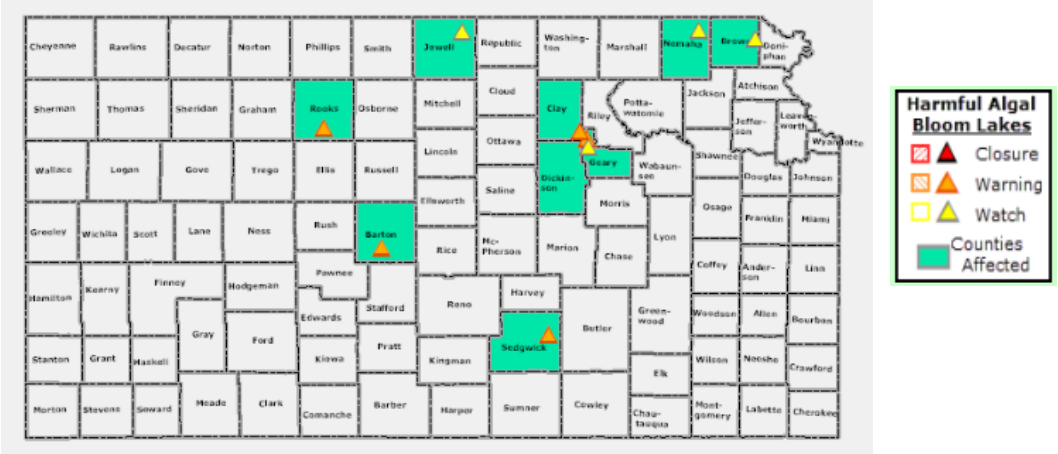
Saline basin: Wilson Lake continued to reach new record low levels in the month of July, more than 9 feet below the top of the multipurpose pool elevation. ecreation is significantly impacted and the Wilson Lake community has asked for help. The KWO has asked the U.S. Army Corps of Engineers for a reduced minimum release to help mitigate some of the impacts from drought. Reducing the release will not stop the lake level from declining, due to the lack of inflow, but it is the only available action. The Corps of Engineers is evaluating the request.

Smoky Hill basin: The majority of the Smoky Hill basin was dry, relative to the eastern portion of the state in July. Kanopolis inflows were moderate to low throughout the month and the pool declined but remained above conservation elevation. Water is discharging through the uncontrolled notch. Downstream flow was below the historical median throughout the month at the USGS gage at Mentor. Cedar Bluff received very little inflow and reflects the drier Upper Smoky Hill basin.

Harmful Blue-Green Algal Blooms (lake water safety)
KDHE has issued two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. These notification levels are determined by the concentration of a harmful toxin(s) or the concentration of cyanobacteria cell counts.

Blue-Green Algae Bloom Warning is in effect for Chisolm Creek Park Lake, Sedgwick County; Memorial Park Lake, Barton County; Milford Reservoir (zones B & C), Clay, Dickinson, Geary counties; and Plainville township Lake, Rooks County (August 4, 2015).

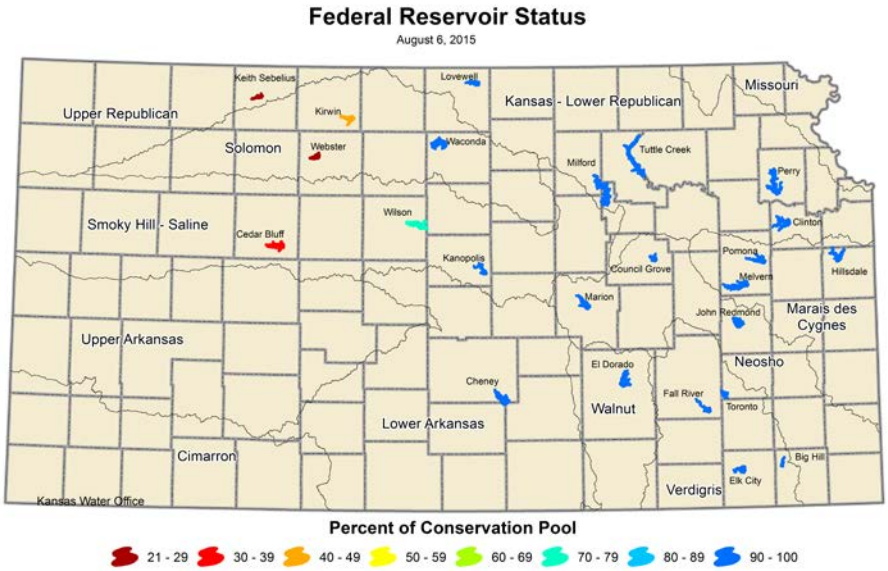
Blue-Green Algae Bloom Watch is in effect for Sabetha City Lake, Nemaha County; Brown County State Fishing Lake; Lovewell Reservoir, Jewell County; and Milford Reservoir (zone A), Geary County (August 4, 2015).



Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged.

Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**07/31/2015 06:00 AM**		
Norton[1]	2304.3	2288.15	-16.15	28.4
Harlan County, NE	1945.73	1933.81	-11.92	56.2
Lovewell[1]	1582.6	1582.06	-0.54	95.6
Milford[1]	1144.4	1146.68	2.28	100.0
Cedar Bluff	2144	2120.65	-23.35	34.8
Kanopolis[1]	1463	1464.80	1.80	100.0
Wilson[1]	1516	1506.79	-9.21	69.1
Webster[1]	1892.5	1871.35	-21.10	25.7
Kirwin[1]	1729.3	1715.20	-14.05	42.3
Waconda[1]	1455.6	1455.02	-0.58	96.7
Tuttle Creek[1]	1075	1074.40	-0.60	97.5
Perry[1]	891.5	894.11	2.61	100.0
Clinton[1]	875.5	877.48	1.98	100.0
Melvern[1]	1036	1036.83	0.83	100.0
Pomona[1]	974	974.67	0.67	100.0
Hillsdale[1]	917	917.11	0.11	100.0
Arkansas River Basin		**8/5/2015 (7/31/2015 11:00 AM no lake level data available from USACE)**		
Cheney	1421.6	1422.63	1.03	100.0
El Dorado	1339	1340.39	1.39	100.0
Toronto[1]	901.5	902.24	0.74	100.0
Fall River[1]	948.5	948.86	0.36	100.0
Elk City[1]	796	796.93	0.93	100.0
Big Hill	858	857.88	-0.12	100.0
Council Grove[1]	1274	1274.16	0.16	100.0
Marion[1]	1350.5	1350.99	0.49	100.0
John Redmond[1]	1039	1044.13	3.13	100.0

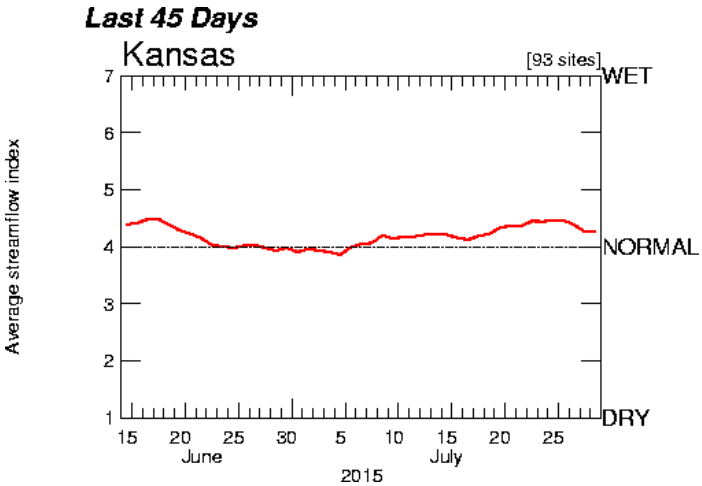
[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

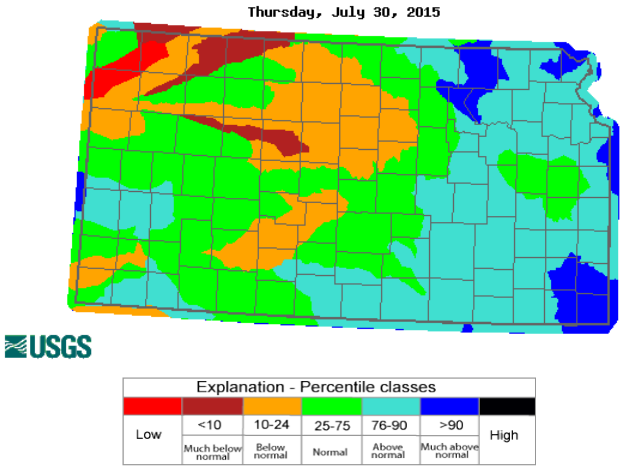
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

Streamflow Conditions

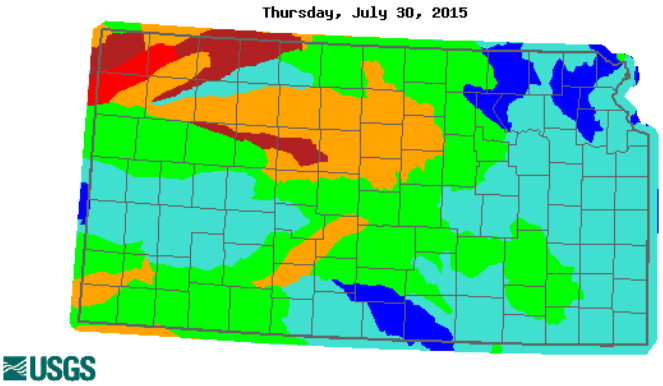
Kansas streamflows during July varied across the state, but remain below historical normal flows in parts of west and central Kansas. The graph below left provides an overview of streamflow for the state.

The comparison of present **28-day** streamflow to historical is shown on the map below, right.

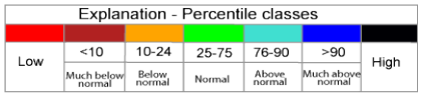




The comparison of present **7-day** streamflow to historical is shown on the map below left.



In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.



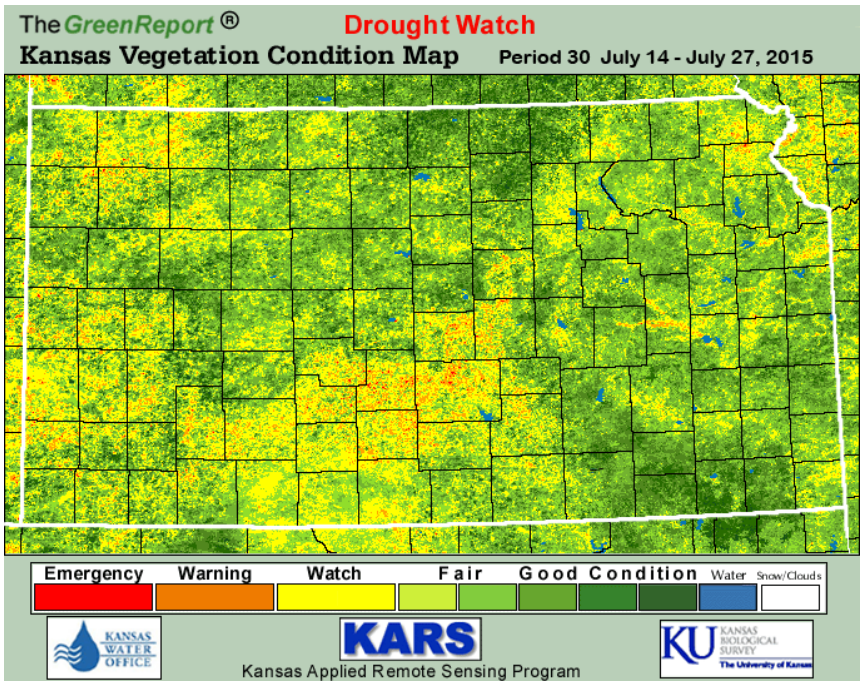
Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

Streamflows in cubic feet per second (cfs)							
Gaging Station	**Flow July 9**	**Flow July 16**	**Flow July30**	**July MDS**	**August MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	221	298	246	150	150	03/20/15; ceased 05/29/15	
Republican River at Clay Center	474	462	450	200	200	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	14	11	7	35	15	03/23/15	3
Saline River near Russell	1	5	3	2	2	10/22/14; ceased 07/31/15	9
Little Arkansas River at Alta Mills	NA	NA	9	8	8	01/16/15; ceased 04/28/15	

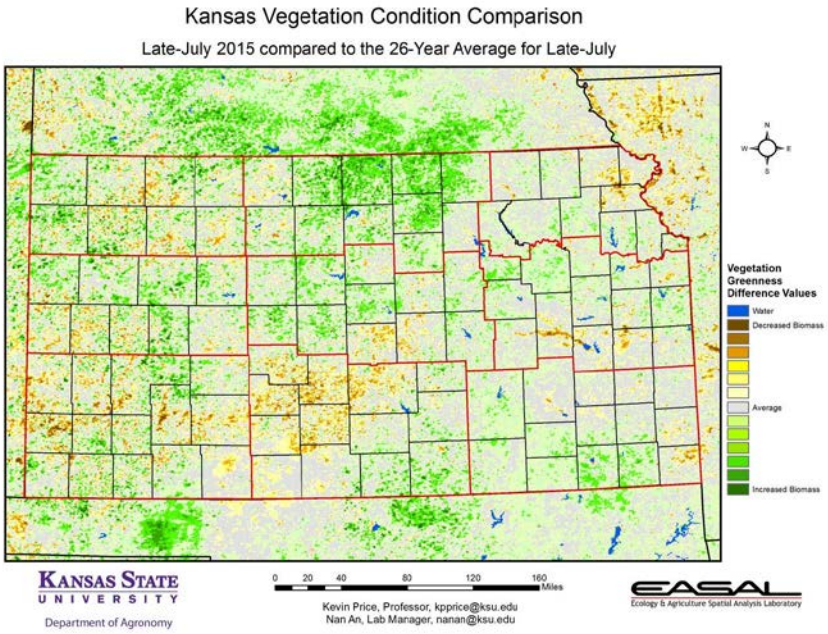
Soil, Crop and Vegetation

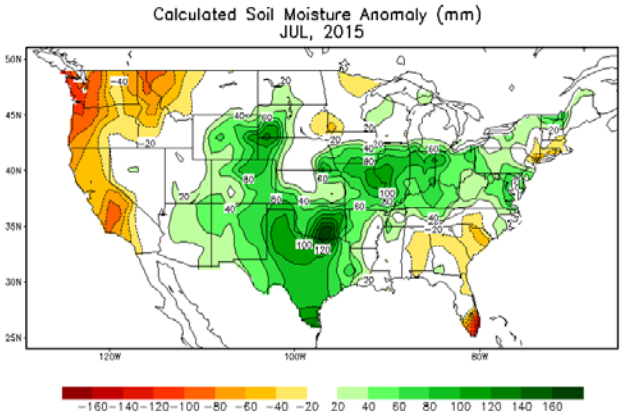
Kansas Vegetative Conditions



The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Most of the state is in excellent condition for this time of year Pockets of dryness are still present in the South-central area and other western areas.

Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for July 14-27 (late July) from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state has average to above average biomass production. The biggest decrease in centered south of the Arkansas River in Edwards, Stafford and Pratt counties. Vegetation in the area is more susceptible to short term rainfall deficits, due to the sandy soils in the region.





Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology.
http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending July 26, 2015 reported topsoil moisture rated 4 percent very short, 20 short, 70 adequate, and 6 surplus. Subsoil moisture rated 6 percent very short, 19 short, 73 adequate, and 2 surplus.

Field Crops:

Corn condition rated 3 percent very poor, 8 poor, 31 fair, 49 good, and 9 excellent. Corn silking was at 80 percent, near 84 last year and 83 for the five-year average. Dough was at 18 percent, behind 34 last year and 33 average.

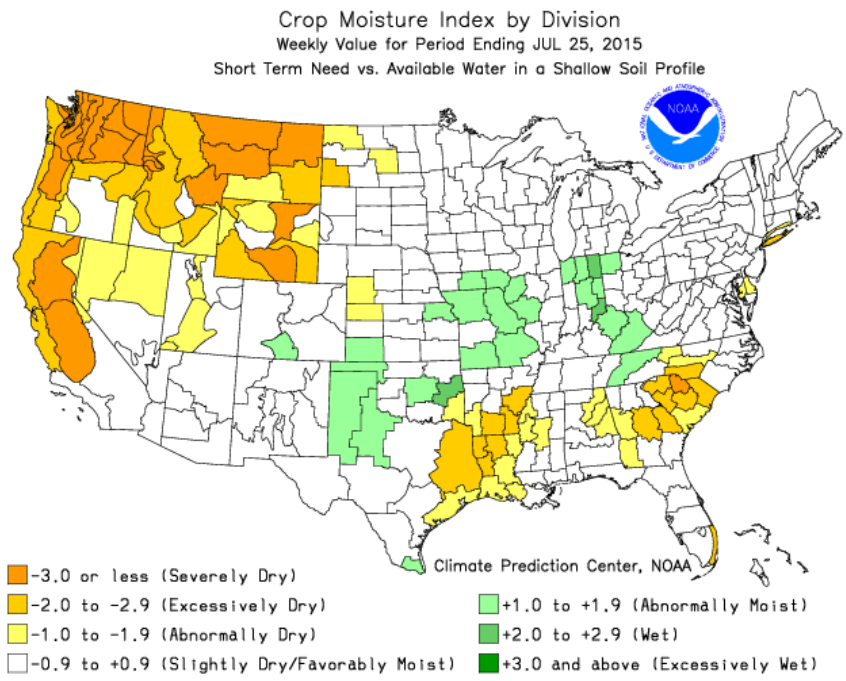
Soybeans condition rated 1 percent very poor, 8 poor, 41 fair, 46 good, and 4 excellent. Soybeans blooming was 48 percent, behind 58 last year and 56 average. Setting pods was 16 percent, behind 22 last year, but near 14 average.

Sorghum condition rated 1 percent very poor, 4 poor, 29 fair, 61 good, and 5 excellent. Sorghum headed was 11 percent, near 13 last year and 15 average.

Sunflowers condition rated 1 very poor, 2 poor, 27 fair, 61 good, and 9 excellent. Sunflowers emerged was 96 percent, near 95 last year and 97 average. Blooming was 14 percent, near 15 last year, but behind 19 average.

Alfalfa hay conditions rated 1 percent very poor, 6 poor, 32 fair, 56 good, and 5 excellent. Alfalfa hay second cutting was 95 percent, near 93 last year and 97 average. Third cutting was 38 percent, ahead of 27 last year, but equal to the average.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 2 very poor, 7 poor, 30 fair, 50 good, and 11 excellent. Stock water supplies rated 3 percent very short, 8 short, 85 adequate, and 4 surplus. (http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)



The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.

Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at:
http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation

activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

August 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	4.65	1.52	149%	74.9	0.4	99 (5)	52 (7)
Dodge City	2.14	-0.94	69%	79.1	-0.5	106 (13)	49 (8)
Garden City	6.53	3.75	235%	78.1	-0.1	105 (13)	54 (8)
Goodland	2.28	-1.19	66%	75.8	0.1	101 (24)	52 (7)
Guymon, OK	5.10	2.44	192%	80.1	0.5	103 (17)	53 (8)
Hill City	6.46	2.75	174%	79.5	0.4	105 (24,12)	51 (8)
Lamar, CO	2.97	0.08	103%	78.0	0.7	104 (13)	54 (7)
McCook, NE	1.92	-1.33	59%	77.4	1.5	106 (5)	54 (29,8)
Springfield, CO	3.22	0.39	114%	75.5	-0.7	100 (13)	54 (8,7)
Central							
Concordia	3.57	-0.35	91%	77.5	-1.6	101 (24)	53 (8)
Hebron, NE	2.55	-1.58	62%	76.3	-0.8	98 (24)	51 (8)
Medicine Lodge	10.65	7.27	315%	81.9	-0.2	105 (13)	62 (8, 7)
Ponca City, OK	6.01	2.68	180%	83.0	1.3	100 (1)	64 (8,7)
Salina	3.86	0.43	113%	82.5	1.4	107 (24)	57 (8)
Wichita (ICT)	7.40	4.08	223%	82.2	1.1	100 (28,24)	63 (8,7)
East							
Bartlesville, OK	5.14	1.73	151%	81.1	0.0	98 (20)	64 (8)
Chanute	4.80	0.43	110%	80.4	0.9	97 (24)	62 (7)
Fall City, NE	6.10	1.06	121%	76.6	-0.9	95 (24,17)	58 (9,4)
Johnson Co. Exec. Apt	7.07	3.35	190%	77.4	-0.9	97 (14)	59 (9)
Joplin, MO	5.09	1.28	134%	81.0	0.8	97 (29)	65 (31,7)
Kansas City (MCI), MO	6.75	2.30	152%	77.5	-0.8	96 (14)	59 (9,4)
St. Joseph, MO	5.79	0.60	112%	77.2	0.1	96 (14)	57 (4)
Topeka (TOP	9.33	5.51	244%	79.1	0.1	100 (24)	60 (4)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – August 2015 Summary

Climate, Drought Conditions and Responses for Kansas

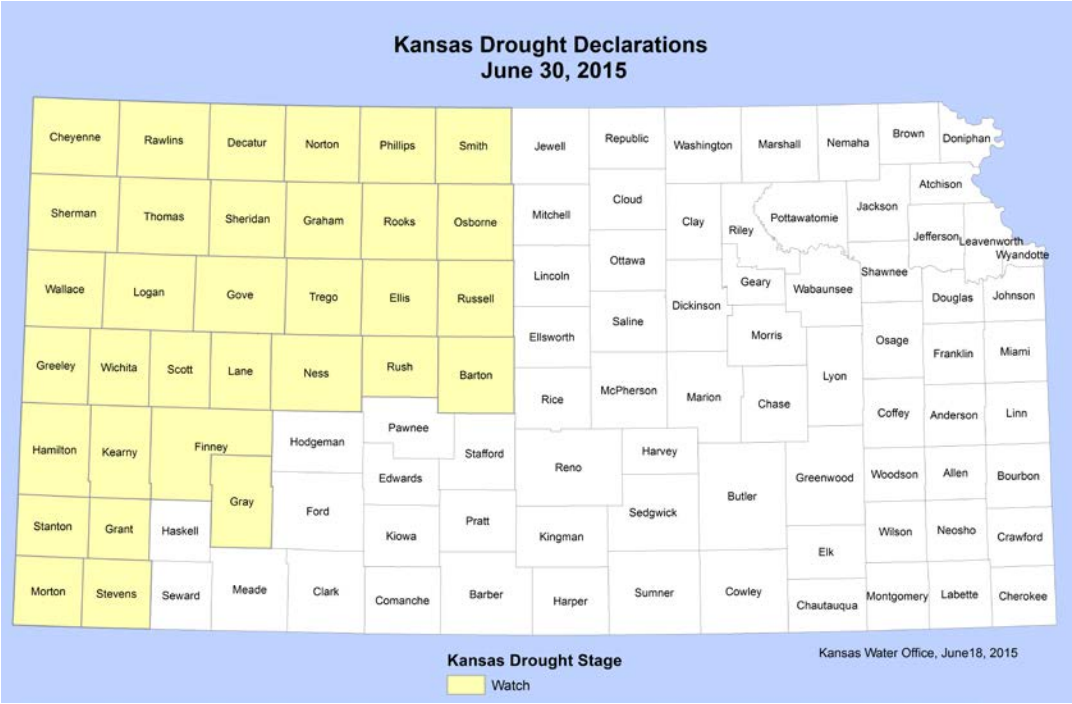
General

- June 29, 2015, Executive Order (EO) 15-04 issued by Governor for a drought watch for 33 counties.
- The US Drought Monitor indicated dry conditions persist across eight percent of Kansas for the last week of August, ending September 1.
- Precipitation for the water year, October 1 thru present has not caught up to normal in parts of northwest and central Kansas. Parts of 12 counties are four to eight inches behind.
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, due to drought. An additional 14 contiguous counties are also eligible federal for assistance.
- USDA declared three Kansas Counties Primary disaster areas due to tornados, excessive rain, flooding or high winds. An additional 18 contiguous counties are also eligible for federal assistance.
- Disaster declaration by the President issued for severe storms, tornados, straight line winds and flooding May 4-June 21, 2015. This makes disaster aid available through Federal Emergency Management Agency (FEMA).

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration was in effect on the Smoky Hill River throughout August.
- Blue-Green Algae Bloom Warning is in effect for Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; McPherson County State Fishing Lake, McPherson County; Melvern River Pond, Osage County; Memorial Park Lake, Barton County; Milford Reservoir (zones A, B & C), Clay, Dickinson, Geary counties; Nemaha State Fishing Lake, Nemaha County; Plainville township Lake, Rooks County and Sabetha City Lake, Nemaha County (August 28, 2015).
- Blue-Green Algae Bloom Watch is in effect for Harvey County East Lake, Harvey County (August 28, 2015).

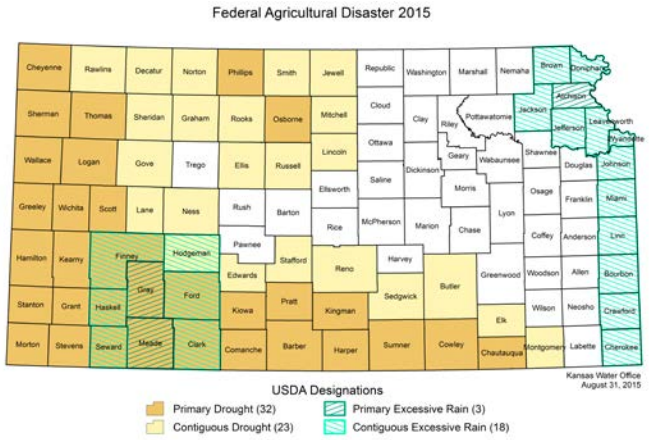
Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.



Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal Drought: USDA has designated 32 Kansas counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Osborne, Phillips, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 23 contiguous counties are also eligible for natural disaster assistance. These are Butler, Decatur, Edwards, Ellis, Elk, Gove, Graham, Hodgeman, Jewell, Lane, Lincoln, Mitchell, Ness, Norton, Rawlins, Reno, Rooks, Russell, Sheridan, Smith, Stafford, Sumner and Montgomery.



Federal Other: USDA has designated three Kansas counties as Primary Disaster Areas for 2015 due to tornados, high winds, excessive rain or flooding. These are Atchison, Gray and Meade. In addition 18 Kansas counties, contiguous to primary disaster counties are also eligible for natural disaster assistance. These are Bourbon, Brown, Cherokee, Clark, Crawford, Doniphan, Finney, Ford, Haskell, Hodgeman, Jackson, Jefferson, Johnson, Leavenworth, Linn, Miami, Seward and Wyandotte.

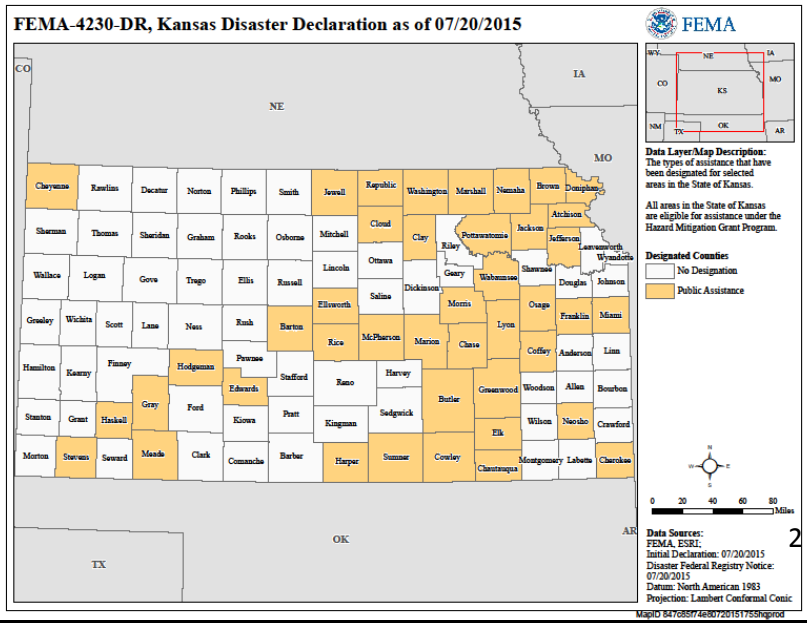
Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

July 20, 2015 the President declared disaster for Kansas areas affected by severe storms, tornadoes, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The President's action makes federal funding available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornadoes,



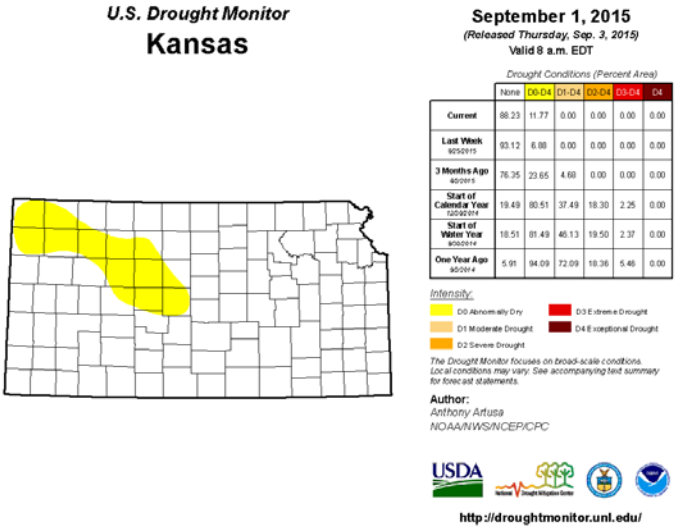
and flooding in the counties of Atchison, Barton, Brown, Butler, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Cowley, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Harper, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Marion, Marshall, McPherson, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Rice, Stevens, Sumner, Wabaunsee, and Washington.

Federal funding is available on a cost-sharing basis for hazard mitigation measures statewide. More information may be found at http://www.fema.gov/news-release/2015/07/20/federal-aid-programs-state-kansas-declaration.

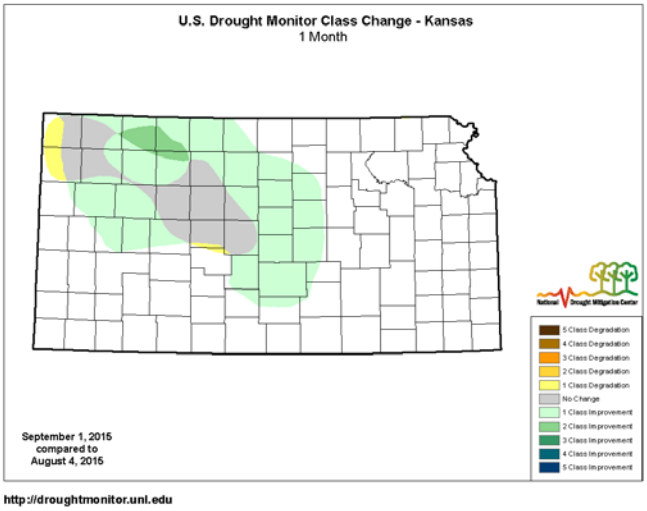
General Conditions

Drought conditions deteriorated slightly, which was not unexpected, given the lower than average precipitation. Greater expansion was limited due to the wetter than normal conditions in June and the cooler than normal temperatures this month. Only abnormally dry conditions remain on the latest U.S. Drought Monitor map. This area is in portions of the Northwest, North Central and Central climate divisions, where rainfall for growing season is less than normal. A return to normal or above normal precipitation is needed to sustain improvements. Long-term hydrological deficits remain, affecting some western reservoirs, streamflow and groundwater recharge as well as water supply.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

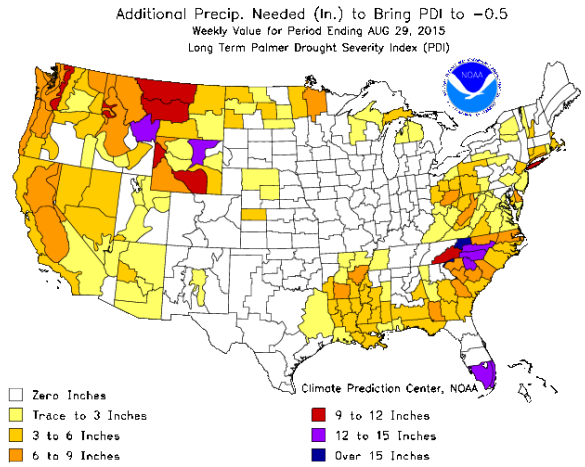


	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	88.23	11.77	0.00	0.00	0.00	0.00
Last Week 8/25/2015	93.12	6.88	0.00	0.00	0.00	0.00
3 Months Ago 6/02/2015	76.35	23.65	4.69	0.00	0.00	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/02/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 9/02/2014	5.91	94.09	72.09	18.36	5.46	0.00



Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought. Note the Northwest Climate division continues to lack moisture.



Climate Division	Precipitation needed to End Drought (inches)			
	Week ending August 8	Week ending August 15	Week ending August 22	Week ending August 29
Northwest	4.86	5.27	4.98	5.33
West Central	-	-	-	-
Southwest	-	-	-	-
North Central	-	-	-	-
Central	-	-	-	-
South Central	-	-	-	-
Northeast	-	-	-	-
East Central	-	-	-	-
Southeast	-	-	-	-

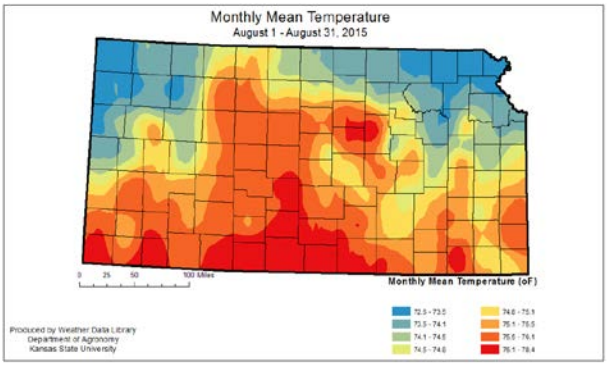
Climate Summary (Temperature and Precipitation)

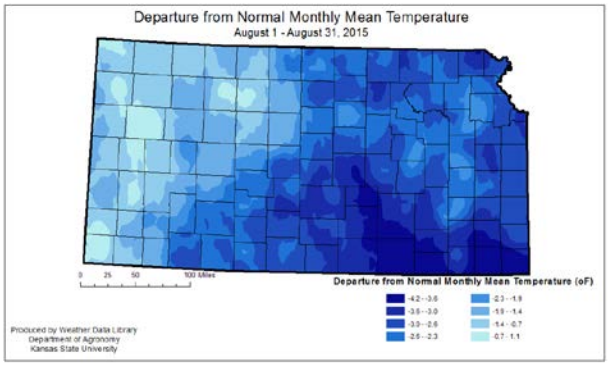
Temperatures were cooler than normal across the state. The state-wide average temperature was 75.0°F, 2.1 degree cooler than normal for the month. There were no new record high temperatures set during the month. In contrast, there were 9 new record cold high temperatures, and 3 records that tied. On the low temperature side, the same trend prevailed with 15 new record low minimum temperatures and 11 records tied. There were 3 new record daily warm minimum temperatures for the month, but no new monthly record lows set. The western divisions were the closest to normal, averaging between 0.7 and 0.9 degrees cooler than normal. The Southeast and the South Central divisions were the coldest, with both averaging 3.5 degrees cooler than normal. The warmest reading was 108°F and was recorded on the 9th at Hays, Ellis County (NWS). The coolest reading for the state was 42°F at Oberlin, Decatur County (NWS) on the 25th. While the temperatures weren't particularly outside of the normal range, late-planted spring crops such as corn and soybeans are still behind in development, with rising concerns that an early frost will have a negative impact on yields

The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

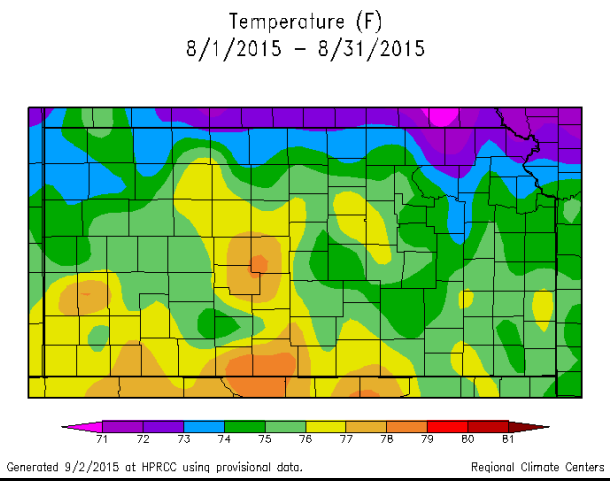
	Kansas Climate Division Temperature Summary (°F)							
	August 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	89.3	58.9	74.1	-0.7	105	27	42	25
West Central	89.4	60.2	74.8	-0.8	103	27	44	24
Southwest	89.6	63.1	76.3	-0.9	106	7	49	24
North Central	87.4	61.8	74.6	-2.5	101	27	43	25
Central	88.3	62.8	75.5	-2.6	108	9	45	24
South Central	87.2	64.2	75.7	-3.5	101	9	50	25
Northeast	85.4	63.0	74.2	-2.1	95	3	45	24
East Central	85.6	63.5	74.5	-2.6	96	10	47	25
Southeast	85.8	64.3	75.0	-3.5	98	9	50	20
STATE	87.6	62.4	75.0	-2.1	108	9th	42	25th
Data Source: KSU Weather Library								

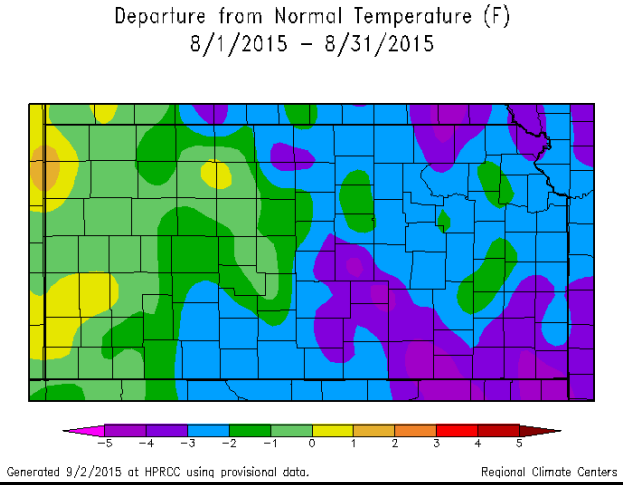
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.

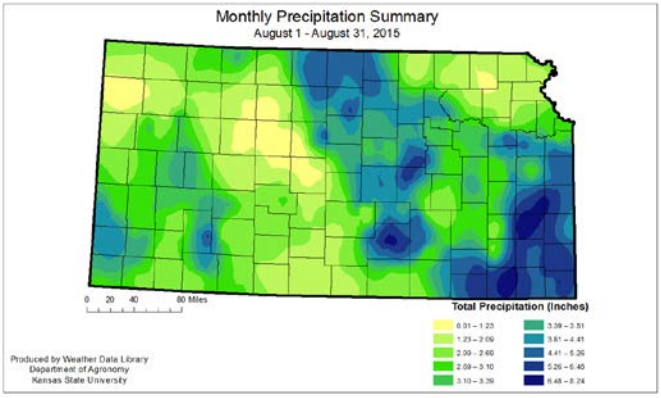


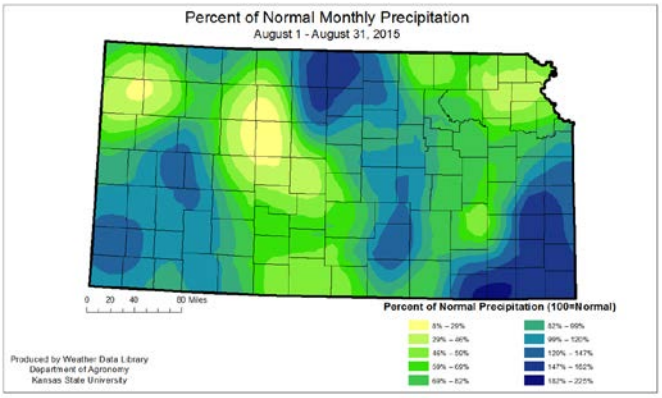


August was drier than normal in most of the state. State-wide average precipitation was 2.80 inches or 85 percent of normal. The Northeast division of the state saw the lowest percent of normal precipitation at 46 percent or an average of 1.80 inches. The Northwest wasn't far ahead with 56 percent of normal or an average of 1.55 inches. The two divisions with above normal precipitation were the Southwest and Southeast divisions. The Southwest division saw 101 percent of normal, or an average of 2.73 inches, while the North Central Division had 130 percent of normal or an average of 4.74 inches. The state-wide average was 2.80 inches or 83 percent of normal. This ranks as the 55th driest August on record, placing it in the middle third of the 121 year distribution. The greatest monthly precipitation reports were 8.42 inches at Iola 1W, Allen County (NWS) and 8.78 inches at Wichita 3.2 NW, Sedgwick County, (CoCoRaHS). While 73 new daily precipitation records were set, none of these were new records for August.

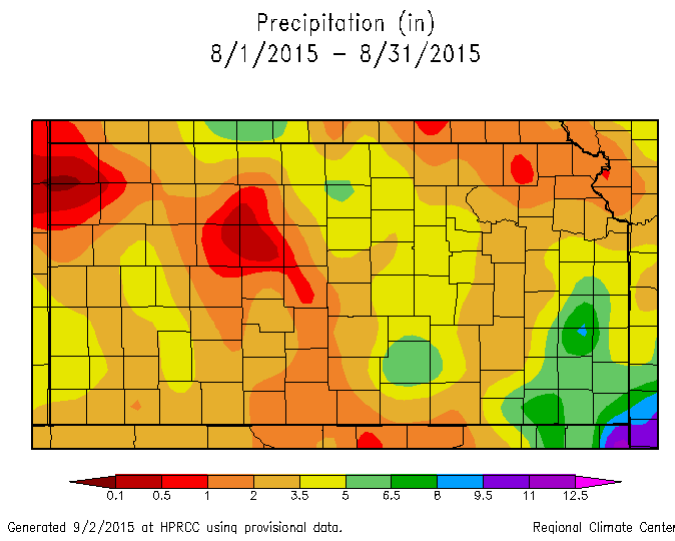
Kansas Climate Division Precipitation Summary (inches) - Summary August 2015												
	August 1-31, 2015			January 1 – August 31, 2015			April 1 – August 31, 2015			September 1 – August 31, 2015		
Climate Division	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	1.55	-1.18	56	15.46	-1.43	91	14.90	0.31	102	18.55	-2.81	87
West Central	1.69	-0.92	64	16.31	0.02	100	15.44	1.65	112	20.14	-0.63	97
Southwest	2.73	0.02	101	21.15	5.71	136	19.34	6.28	147	26.05	6.15	130
North Central	2.92	-0.36	89	20.47	-0.82	94	19.14	1.32	106	25.35	-2.66	89
Central	3.23	-0.34	87	20.75	-1.73	91	19.26	0.73	102	26.99	-2.30	91
South Central	2.54	-0.90	73	25.51	2.04	108	23.86	5.01	126	31.14	-0.18	99
Northeast	1.80	-2.10	46	28.13	2.47	109	25.92	4.46	120	36.34	1.34	103
East Central	3.20	-0.89	78	26.87	-0.74	96	24.72	2.04	108	35.23	-2.69	91
Southeast	4.74	1.00	130	28.89	-0.52	98	26.85	3.44	114	40.43	-1.06	96
STATE	2.80	-0.52	83	22.73	0.73	103	21.15	3.00	116	29.06	-0.32	99

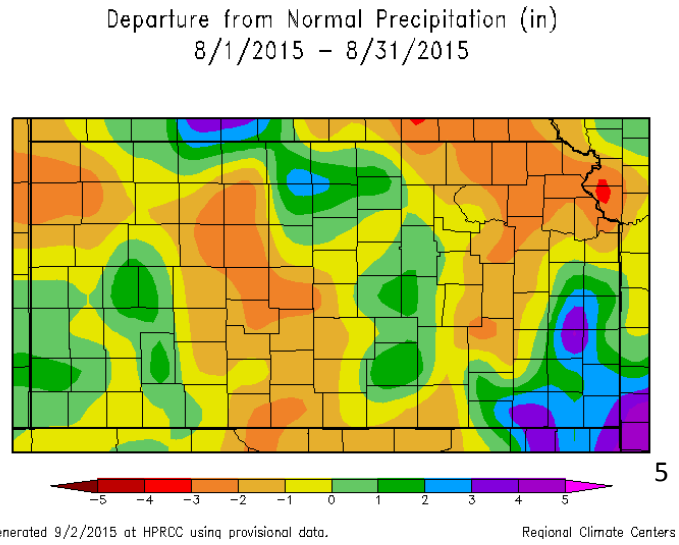
Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.



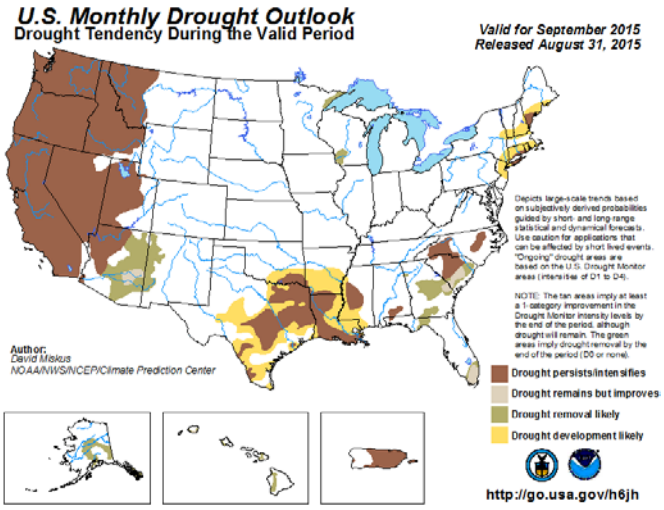


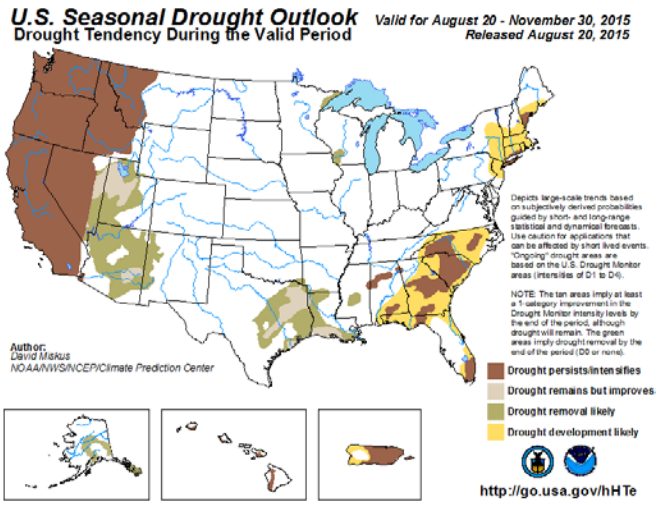
Severe weather was more limited in August, as storm systems were less common. Preliminary data indicates there were 2 tornadoes reported, compared to 7 in July, 15 during June and 99 in May. Hail reports were also fewer with 45 reports this month versus 55 reports in July, 83 in June and 108 in May. Damaging winds were also less common. There were 65 reports in August, 114 reports in July, 65 reports in June and only 52 reports last May.

Future Outlook

An El Niño has been declared. It continues to be strong, but it is uncertain how much impact will result from that pattern. An El Niño generally favors wetter than normal conditions in the Central Plains. The ridging pattern along the western Rockies is also expected to continue. This has resulted in a split pattern, with the Central Plains as the dividing line. Warmer than normal conditions are to the west, while cooler than normal conditions are in place to the east.

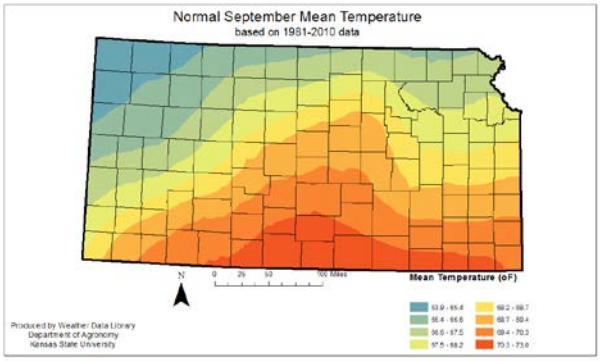
The Drought Outlook for the month of September and the Season Outlook for Mid-August through the end of November are provided below.

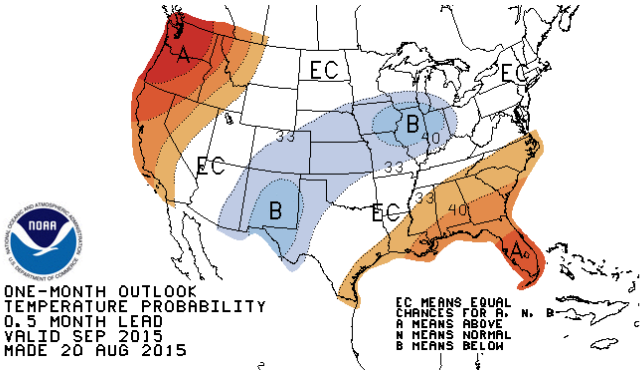


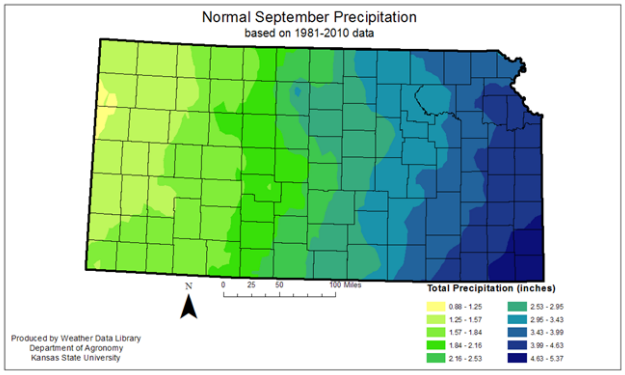


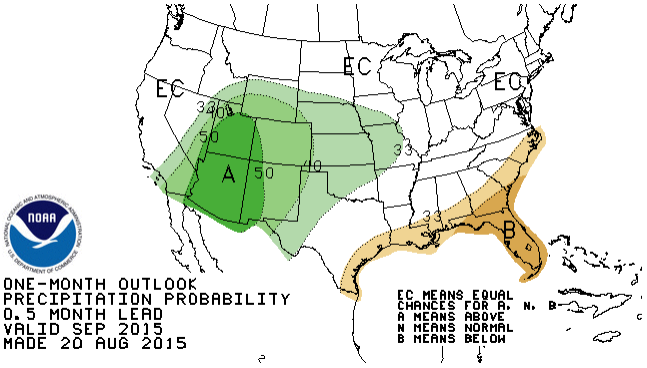
The outlook for September calls for cooler and wetter than normal conditions, despite the warm start to the month. This pattern is expected to continue in the September-November period. The precipitation outlook shows Kansas at the north end of a wetter than average area centered to the southwest. A wet pattern in the southern Plains and the desert southwest makes it less likely that we will have drier than normal conditions in Kansas. For Kansas, the average precipitation ranges from 6-8 inches in southeastern Kansas to less than 2 inches in western Kansas. The outlook doesn't indicate how precipitation over the three month period might be distributed, although the September outlook is encouraging.

Temperatures are expected to be cooler than normal in west Texas and into the Oklahoma Panhandle. Cooler than average temperatures are expected in September. The average temperatures for the period range from over 58°F in the South Central climate division to around 50°F in extreme northwestern Kansas.

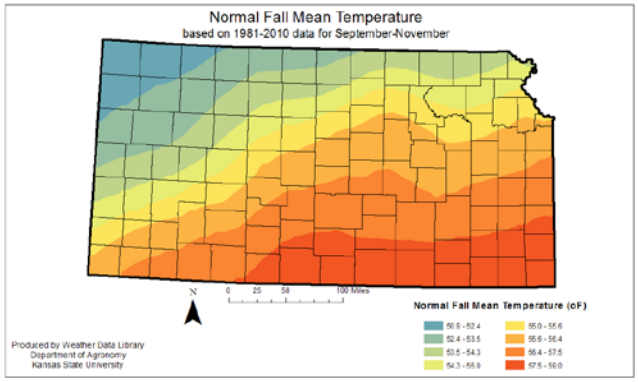


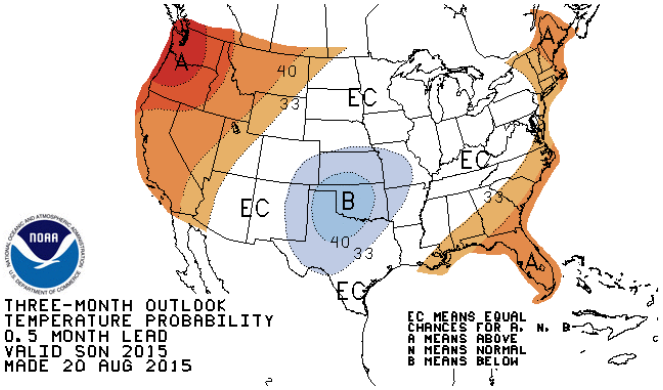


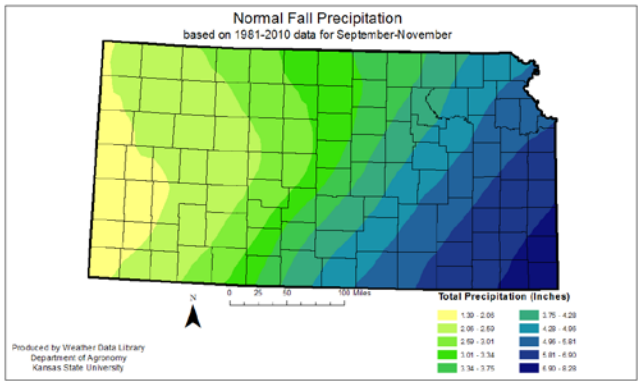


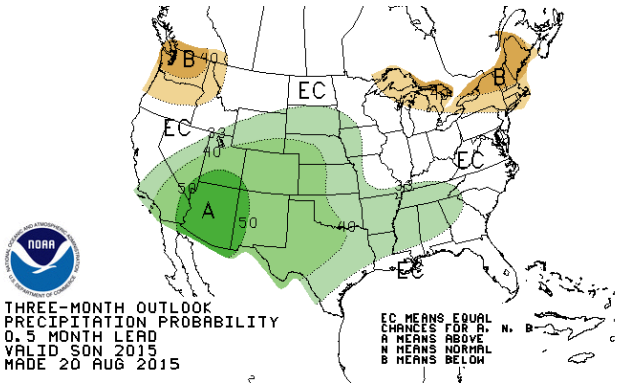


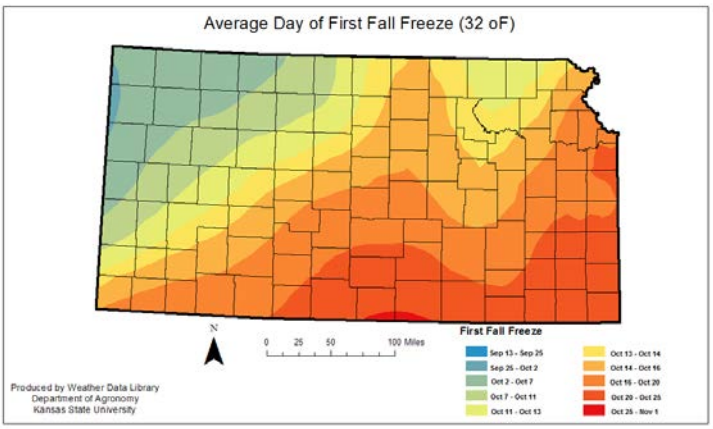
The fall (three-month) outlook favors below normal temperatures and above normal precipitation for September through November.











First Frost: Warm weather has allowed for increased accumulation of growing degree units, but delayed planting and cool temperatures in July and August have raised concerns about autumn conditions. Cool temperatures will delay crop maturity, while the recent dry weather increases concern of available water for planting winter crops such as winter wheat and canola. With crops maturity behind normal and September average temperatures anticipated to be below normal, even a freeze around the average date could adversely affects crops. (KSU Weather Data Library)

Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Effective Monday, June 29, 2015 mandatory Stage III water restrictions are in place for **Russell** water customers. The water restrictions include a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Surface Water Supply Conditions

The conservation pools at the water supply reservoirs in eastern Kansas are full, discharges of excess for flood protection occurring. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool at 37% or less. Wilson Reservoir is also relatively low at only 69% of conservation pool.

Kansas River basin: Inflows in July diminished significantly for Milford, Tuttle Creek, Perry, and Clinton reservoirs in August but near median historical values. All reservoirs retained some flood pool storage for most the month, with the exception of Tuttle Creek. Tuttle was lowered to facilitate some minor repair work to the outlet works. Flow in the Kansas River met or exceeded median values for the majority of the month.

Marais des Cygnes basin: Pomona, Melvern, and Hillsdale reservoirs all experienced a decline over the month due to lack of inflow, as is typical for August. Flows in the Marais des Cygnes generally exceeded median values but not significantly. Over-all storage in the reservoirs is healthy.

Cottonwood / Neosho basin: Council Grove, Marion, and John Redmond reservoirs all declined in August but ended the month at or above normal conservation pool elevations. Flows throughout the basin remained at or above median but significantly less than recent months.

Verdigris basin: Fall River and Elk City reservoirs maintained elevations at or above normal conservation pool. Toronto reservoir is below normal conservation elevation due to an equipment malfunction. Releases were reduced when the error in lake level was discovered. Basin flow conditions were relatively healthy throughout the month.

Saline basin: Wilson Lake level continued to decline, reaching a new record low level in the first week of August, more than nine feet below the top of the multipurpose pool elevation. Recreation is significantly impacted and the Wilson Lake community has asked for help. The KWO has asked the U.S. Army Corps of Engineers for a reduced minimum release to help mitigate some of the impacts from drought. Reducing the release will not stop the lake level from declining, due to the lack of inflow, but it is the only available action. The Corps of Engineers continues to evaluate the request.

Smoky Hill basin: The majority of the Smoky Hill basin was dry relative to the eastern portion of the state. Kanopolis inflows were low throughout the month other than one inflow event in the first week, which resulted in nearly a one foot pool rise. Water discharged through the uncontrolled notch the entire month but might not have without the runoff event in early August. Downstream flow was below the historical median for most of the month at the USGS gage at Mentor but exceeded the low flow target. Cedar Bluff received very little inflow and declined in August, reflecting the drier Upper Smoky Hill basin.

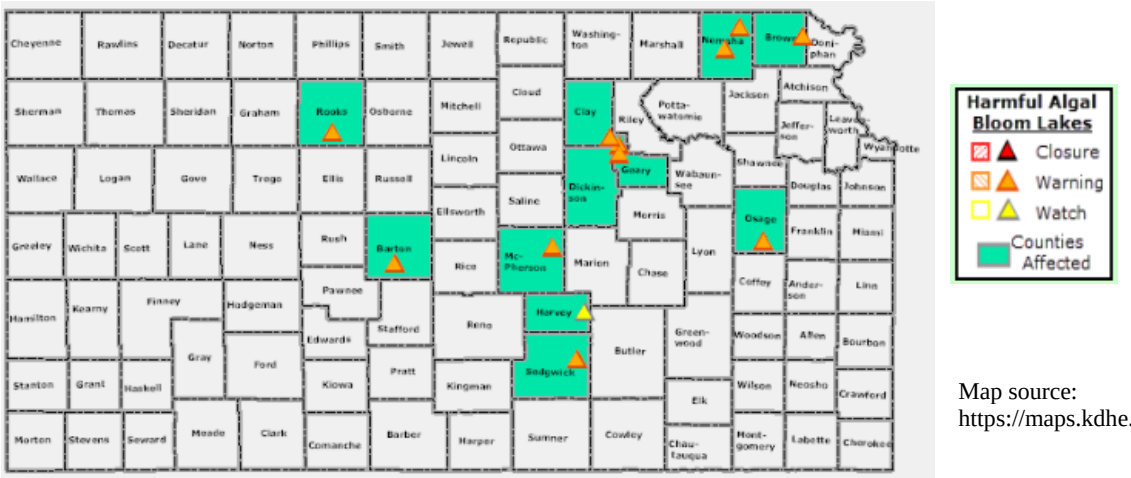
Harmful Blue-Green Algal Blooms (lake water safety)

KDHE has issued two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. These notification levels are determined by the concentration of a harmful toxin(s) or the concentration of cyanobacteria cell counts.

Blue-Green Algae Bloom Warning is in effect for Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; McPherson County State Fishing Lake, McPherson County; Melvern River Pond, Osage County; Memorial Park Lake, Barton County; Milford Reservoir (zones A, B & C), Clay, Dickinson, Geary counties; Nemaha

State Fishing Lake, Nemaha County; Plainville township Lake, Rooks County and Sabetha City Lake, Nemaha County (August 28, 2015).

Blue-Green Algae Bloom Watch is in effect for Harvey County East Lake, Harvey County (August 28, 2015).

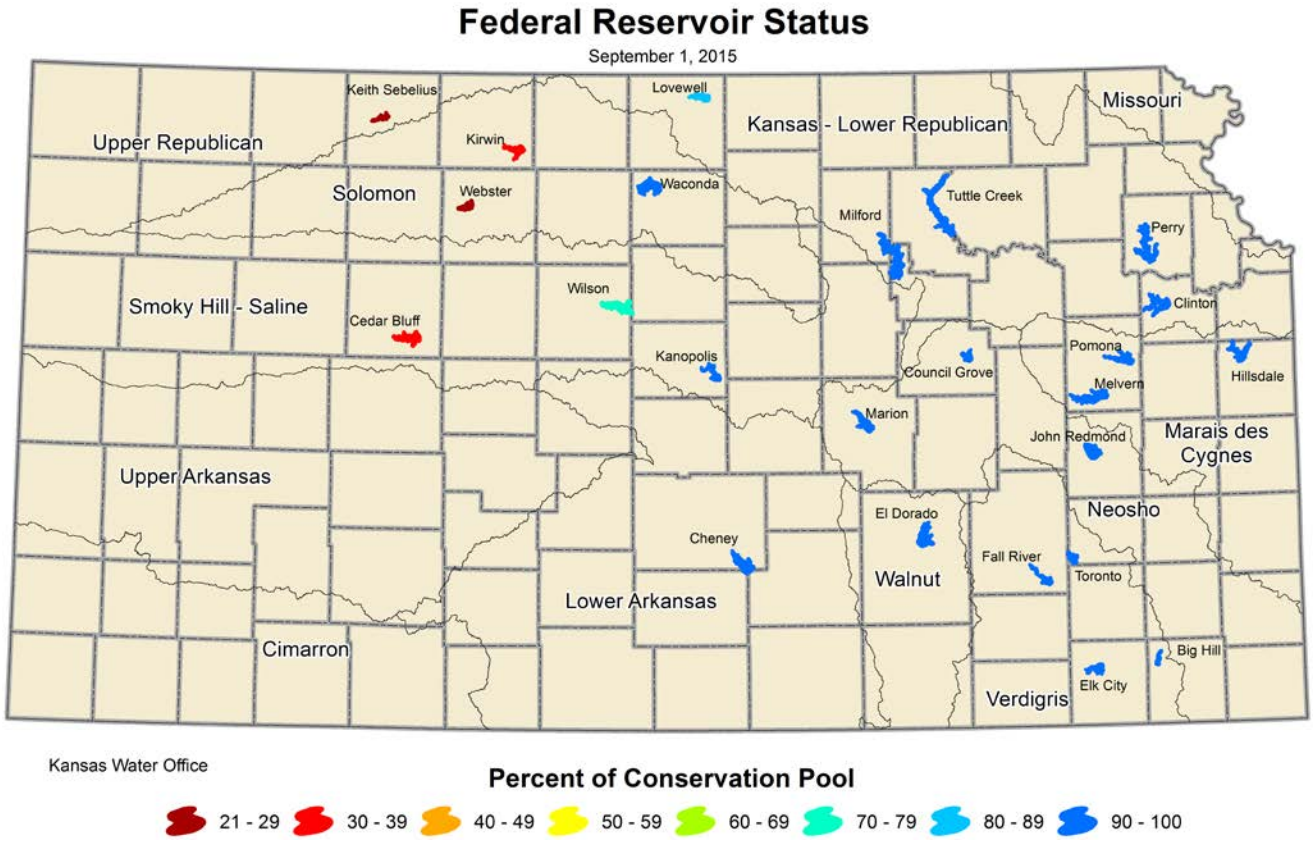


Map source: https://maps.kdhe.state.ks.us/habkscounty/

Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged.

Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**09/01/2015 06:00 AM**		
Norton[1]	2304.3	2288.02	-16.28	28.0
Harlan County, NE	1945.73	1932.05	-13.68	50.9
Lovewell[1]	1582.6	1580.05	-2.55	80.1
Milford[1]	1144.4	1146.35	1.95	100.0
Cedar Bluff	2144	2120.09	-23.91	33.7
Kanopolis[1]	1463	1464.47	1.47	100.0
Wilson[1]	1516	1506.85	-9.15	69.3
Webster[1]	1892.5	1870.79	-21.66	24.4
Kirwin[1]	1729.3	1713.43	-15.82	37.0
Waconda[1]	1455.6	1456.44	0.84	100.0
Tuttle Creek[1]	1075	1074.80	-0.20	99.2
Perry[1]	891.5	892.93	1.43	100.0
Clinton[1]	875.5	877.50	2.00	100.0
Melvern[1]	1036	1036.16	0.16	100.0
Pomona[1]	974	974.22	0.22	100.0
Hillsdale[1]	917	916.86	-0.14	99.1
Arkansas River Basin		**08/31/2015 08:00 AM**		
Cheney	1421.6	1422.24	0.64	100.0
El Dorado	1339	1339.42	0.42	100.0
Toronto[1]	901.5	900.70	-0.80	83.0
Fall River[1]	948.5	948.58	0.08	100.0
Elk City[1]	796	797.76	1.76	100.0
Big Hill	858	858.44	0.44	100.0
Council Grove[1]	1274	1273.98	-0.02	100.0
Marion[1]	1350.5	1350.49	-0.01	100.0
John Redmond[1]	1039	1041.57	0.57	100.0

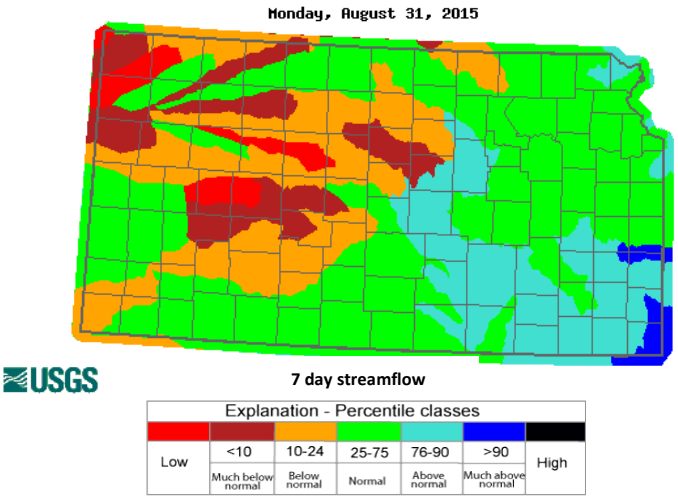
[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

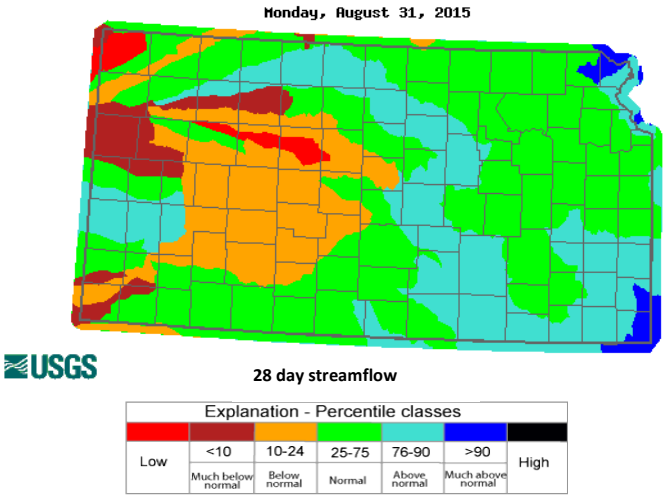
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

Streamflow Conditions

Kansas streamflows during July varied across the state, but remain below historical normal flows in parts of west and central Kansas.

The comparison of present **7-day** streamflow to historical is shown on the map below left and to the **28-day** streamflow compared to historical is shown on the map below, right. Short term streamflow is significantly lower than historical average in many area of western Kansas. The longer, nearly monthly average flow was slightly better compared to historical, with mores areas above normal flow due to storm events that produced abnormal local runoff in August in some of these areas.

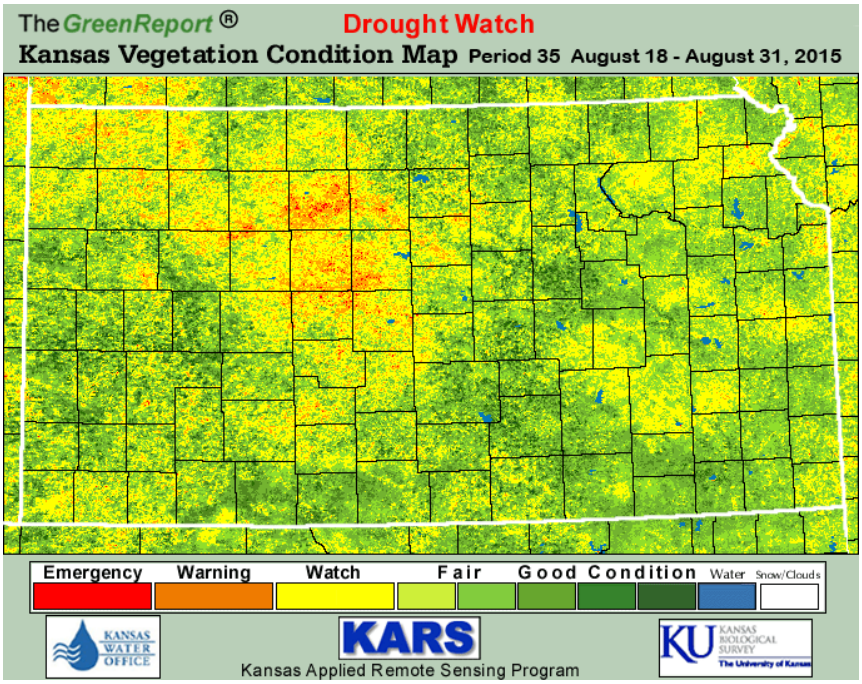




Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

Streamflows in cubic feet per second (cfs)								
Gaging Station	Flow Aug. 6	Flow Aug. 13	Flow Aug. 20	Flow Aug. 27	August MDS	Sept MDS	Administration Date	Number of Rights Admin.
Republican River at Concordia	2580	802	341	230	150	80	03/20/15; ceased 05/29/15	
Republican River at Clay Center	786	1540	462	338	200	100	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	348	10	7	6	15	15	03/23/15	3
Saline River near Russell	NA	NA	2	2	2	2	10/22/14; ceased 07/31/15	
Chapman Creek near Chapman	9	11	7	10	10	10		

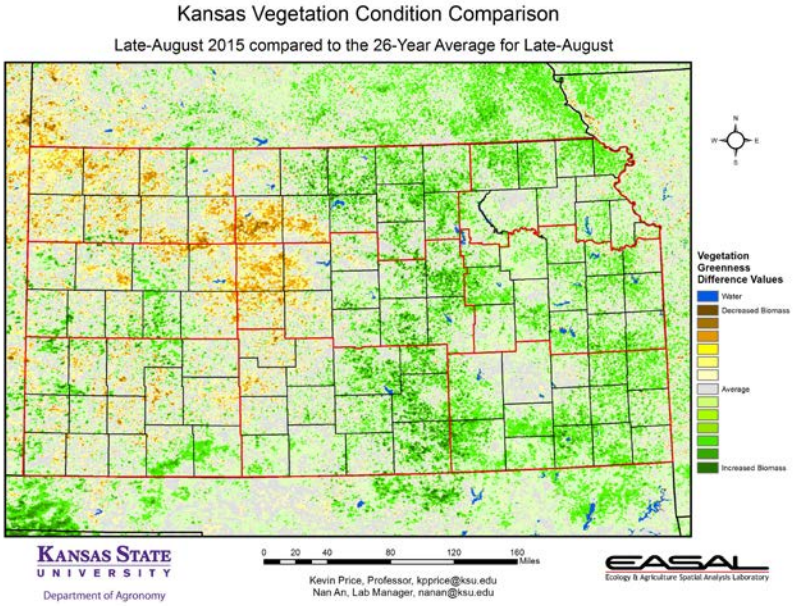


Soil, Crop and Vegetation

Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Most of the state is in great condition for this time of year. Areas of dryness have improved in the south-central parts of the state. Some stress in northwest areas.

Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for August 18–August 31 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state was at or above average photosynthetic activity. The North Central and Northeastern divisions have the greatest activity due to favorable growing conditions and partly due to delayed crop development. This delay means more of the vegetation is in the most active growth period, rather than the reduced activity that comes as the crop matures. An area of abnormally dry conditions continues in the Northwest Division edging into North Central and Central KS. This is reflected in lower than average biomass production in the region.

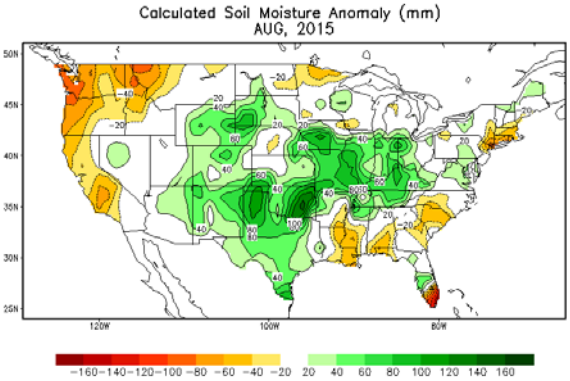


Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology.
http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock



USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending August 30, 2015 reported topsoil moisture rated 5 percent very short, 23 short, 67 adequate, and 5 surplus. Subsoil moisture rated 7 percent very short, 22 short, 70 adequate, and 1 surplus.

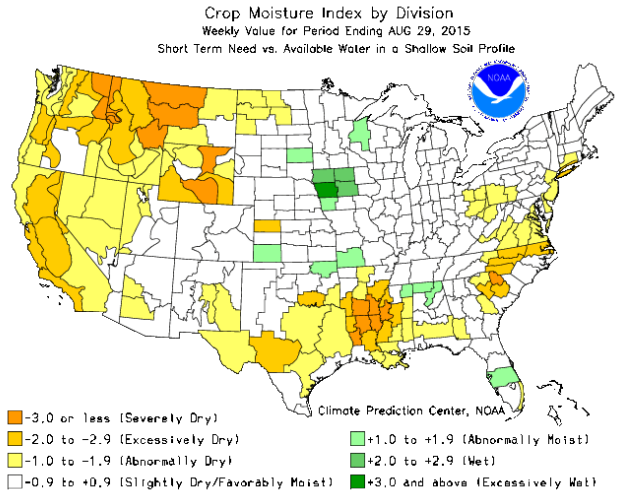
Field Crops:
Corn condition rated 3 percent very poor, 8 poor, 32 fair, 46 good, and 11 excellent.

Soybeans condition rated 1 percent very poor, 7 poor, 35 fair, 50 good, and 7 excellent. Soybeans blooming was 95 percent, near 99 last year and 97 average.

Sorghum condition rated 1 percent very poor, 4 poor, 26 fair, 59 good, and 10 excellent.

Sunflowers condition rated 1 very poor, 2 poor, 30 fair, 59 good, and 8 excellent.
Alfalfa hay conditions rated 1 percent very poor, 6 poor, 32 fair, 55 good, and 6 excellent. Alfalfa third cutting was 96 percent, ahead of 88 last year and 91 average. Fourth cutting was 41 percent, ahead of 25 last year and average.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 2 very poor, 7 poor, 31 fair, 50 good, and 10 excellent. Stock water supplies rated 3 percent very short, 8 short, 87 adequate, and 2 surplus. (http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)



The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.

Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers

who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

August 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	0.88	-1.53	37%	73.5	1.4	96 (26,22)	47 (24,23)
Dodge City	1.75	-1.00	64%	75.7	-2.4	104 (8)	49 (24)
Garden City	1.89	-0.56	77%	75.9	-0.8	99 (8,7)	52 (30,24)
Goodland	0.37	-2.33	14%	74.8	1.1	99 (26)	47 (23)
Guymon, OK	4.87	1.95	167%	77.0	-1.1	102 (6)	53 (30)
Hill City	1.04	-1.87	36%	76.9	0.3	104 (26)	44 (24)
Lamar, CO	4.25	1.97	186%	76.8	1.4	101 (6)	49 (24)
McCook, NE	2.48	-0.66	79%	74.1	0.3	101 (26)	42 (24)
Springfield, CO	1.12	-1.72	39%	75.2	1.0	102 (6)	51 (24)
Central							
Concordia	4.20	1.06	134%	73.7	-3.4	97 (2)	48 (24)
Hebron, NE	1.43	-2.30	38%	72.7	-2.5	95 (2)	43 (24)
Medicine Lodge	1.30	-1.82	42%	78.0	-2.3	101 (8)	52 (20)
Ponca City, OK	2.69	-0.56	83%	78.5	-2.5	102 (8)	53 (25)
Salina	3.99	-0.06	99%	76.8	-2.8	97 (2)	52 (20)
Wichita (ICT)	6.38	2.67	172%	77.0	-3.0	97 (8)	54 (25)
East							
Bartlesville, OK	4.05	0.98	132%	75.5	-4.7	101 (9)	49 (25)
Chanute	6.17	2.48	167%	75.4	-3.5	94 (3,2)	52 (25)
Fall City, NE	0.41	-3.63	10%	72.8	-2.6	91 (2)	46 (24)
Johnson Co. Exec. Apt	3.91	0.19	105%	74.4	-3.2	93 (3,1)	51 (24)
Joplin, MO	8.23	4.88	246%	76.1	-3.6	100 (9)	54 (25,20)
Kansas City (MCI), MO	0.98	-2.91	25%	74.5	-2.6	91 (7,1)	50 (24)
St. Joseph, MO	0.22	-3.76	6%	73.0	-2.3	91 (7)	46 (24)
Topeka (TOP	3.10	-1.14	73%	75.2	-2.2	93 (9,3)	50 (24)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – September 2015 Summary

Climate, Drought Conditions and Responses for Kansas

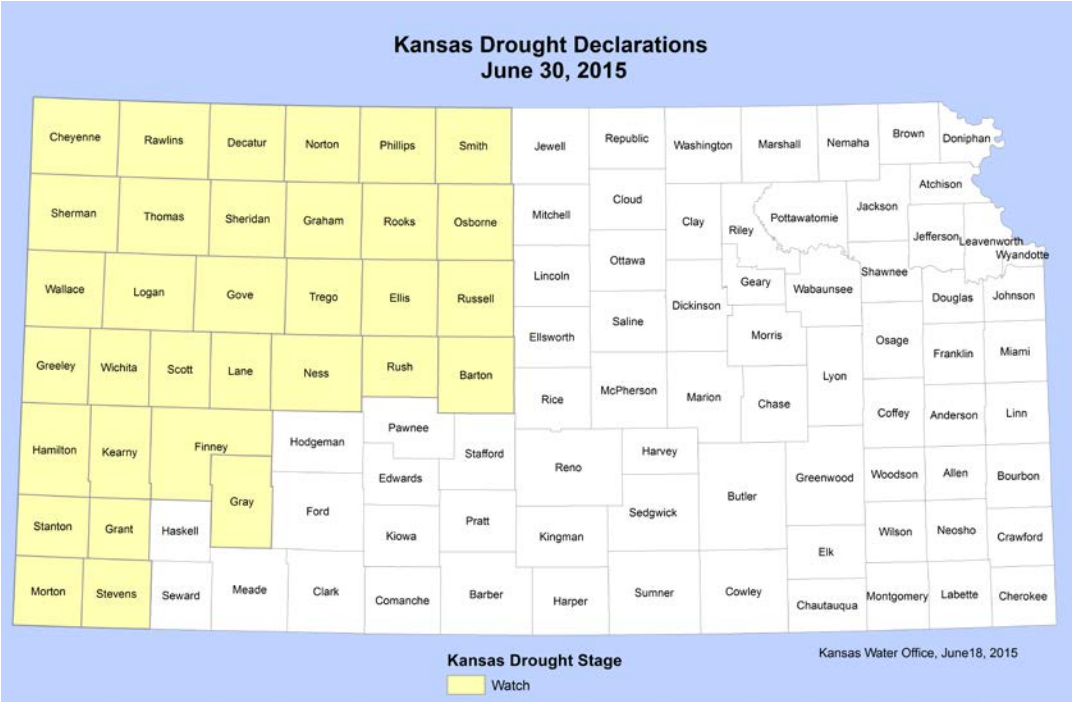
General

- June 29, 2015, Executive Order (EO) 15-04 issued by Governor for a drought watch for 33 counties.
- The US Drought Monitor indicated dry conditions persist across 19 percent of Kansas for the last week of September. Nearly five percent was in moderate drought.
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, due to drought. An additional 14 contiguous counties are also eligible federal for assistance.
- USDA declared three Kansas Counties Primary disaster areas due to tornados, excessive rain, flooding or high winds. An additional 18 contiguous counties are also eligible for federal assistance.
- Disaster declaration by the President issued for severe storms, tornados, straight line winds and flooding May 4-June 21, 2015. This makes disaster aid available through Federal Emergency Management Agency (FEMA).

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration was in effect on the Saline and Smoky Hill rivers throughout September. Administration on the Little Arkansas began September 14 and on Chapman Creek on September 28.
- Blue-Green Algae Bloom Warning is in effect for Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; Harvey County East Lake, Harvey County; Hiawatha City Lake, Brown County; McPherson County State Fishing Lake, McPherson County; Melvern River Pond, Osage County; Milford Reservoir (zone C), Clay, Dickinson, Geary counties; Nemaha State Fishing Lake, Nemaha County; and Plainville Township Lake, Rooks County (Oct. 1, 2015).
- Blue-Green Algae Bloom Watch is in effect for Milford Reservoir (Zone B) (Oct. 1, 2015).

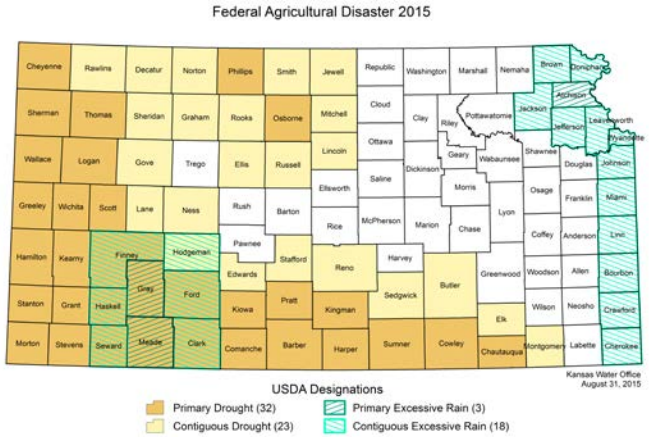
Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.



Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal Drought: USDA has designated 32 Kansas counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Osborne, Phillips, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 23 contiguous counties are also eligible for natural disaster assistance. These are Butler, Decatur, Edwards, Ellis, Elk, Gove, Graham, Hodgeman, Jewell, Lane, Lincoln, Mitchell, Ness, Norton, Rawlins, Reno, Rooks, Russell, Sheridan, Smith, Stafford, Sumner and Montgomery.



Federal Other: USDA has designated three Kansas counties as Primary Disaster Areas for 2015 due to tornados, high winds, excessive rain or flooding. These are Atchison, Gray and Meade. In addition 18 Kansas counties, contiguous to primary disaster counties are also eligible for natural disaster assistance. These are Bourbon, Brown, Cherokee, Clark, Crawford, Doniphan, Finney, Ford, Haskell, Hodgeman, Jackson, Jefferson, Johnson, Leavenworth, Linn, Miami, Seward and Wyandotte.

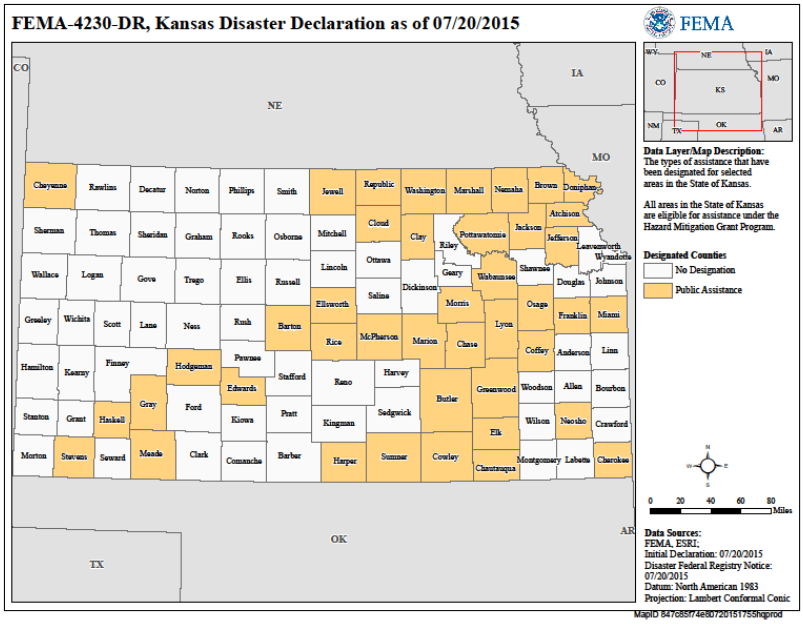
Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

July 20, 2015 the President declared disaster for Kansas areas affected by severe storms, tornadoes, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The President's action makes federal funding available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornadoes, and flooding in the counties of Atchison, Barton, Brown, Butler, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Cowley, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Harper, Haskell, Hodgeman, Jackson, Jefferson, Jewell,



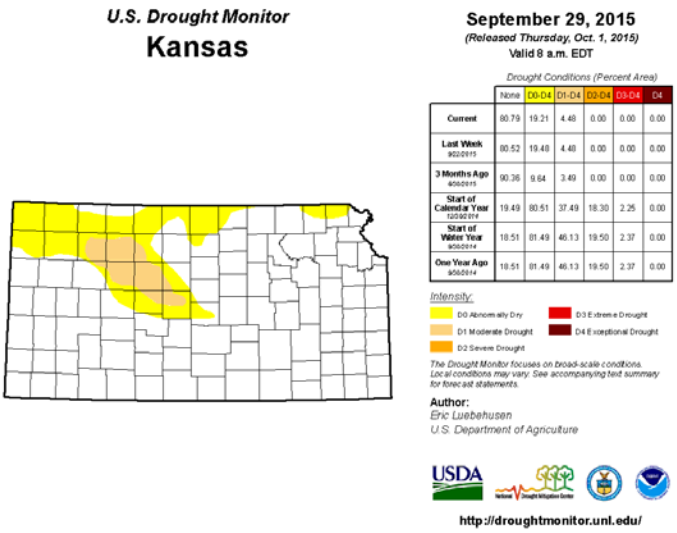
Lyon, Marion, Marshall, McPherson, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Rice, Stevens, Sumner, Wabaunsee, and Washington.

Federal funding is available on a cost-sharing basis for hazard mitigation measures statewide. More information may be found at http://www.fema.gov/news-release/2015/07/20/federal-aid-programs-state-kansas-declaration.

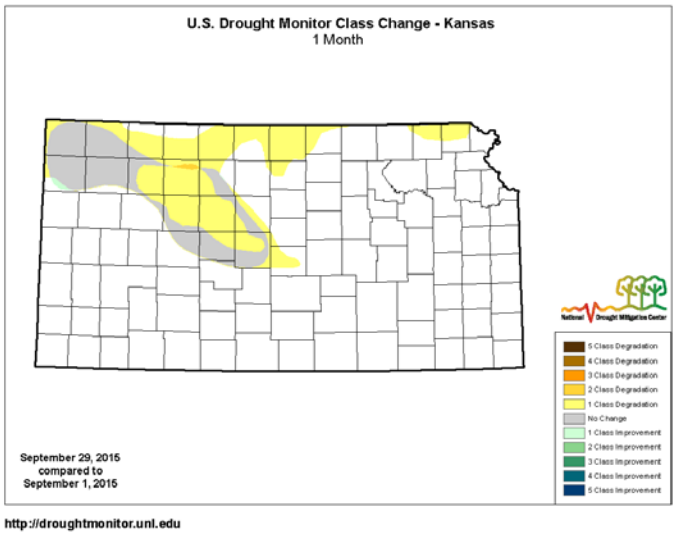
General Conditions

The outlooks for September were a disappointment, as the cooler and wetter than average conditions failed to materialize. September was drier than normal in most of the state. State-wide average precipitation was 1.58 inches or 53 percent of normal. Drought conditions deteriorated, which was not unexpected, given the lower than average precipitation. Moderate drought conditions returned to portions of northwest and central Kansas, and the area of abnormal dry conditions expanded. A return to normal or above normal precipitation is needed to sustain improvements. Some long-term hydrological deficits are in place affecting some water supplies and reservoirs.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

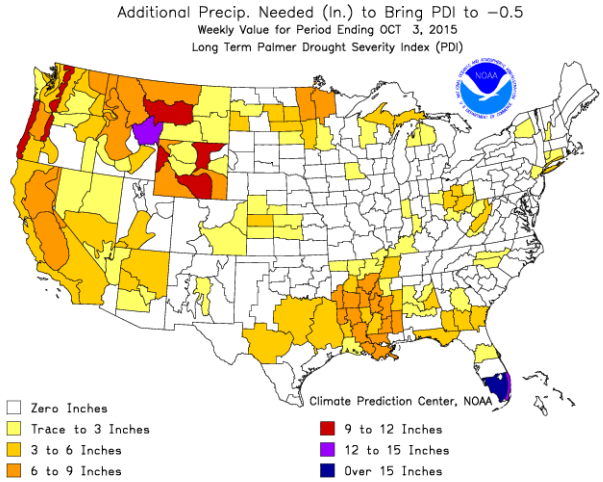


	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	80.79	19.21	4.48	0.00	0.00	0.00
Last Week 9/22/2015	80.52	19.48	4.48	0.00	0.00	0.00
3 Months Ago 6/30/2015	90.36	9.64	3.49	0.00	0.00	0.00
Start of Calendar Year 12/30/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00
One Year Ago 9/30/2014	18.51	81.49	46.13	19.50	2.37	0.00



Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought. Note the Northwest Climate division continues to lack moisture.



Climate Division	Precipitation needed to End Drought (inches)			
	Week ending Sept. 5	Week ending Sept. 12	Week ending Sept. 19	Week ending Sept. 26
Northwest	5.85	5.82	5.98	5.40
West Central	1.69	1.52	0.58	0.69
Southwest	-	-	-	-
North Central	-	-	0.80	1.36
Central	-	-	2.08	2.13
South Central	-	-	-	-
Northeast	-	-	-	-
East Central	-	-	-	-
Southeast	-	-	-	-

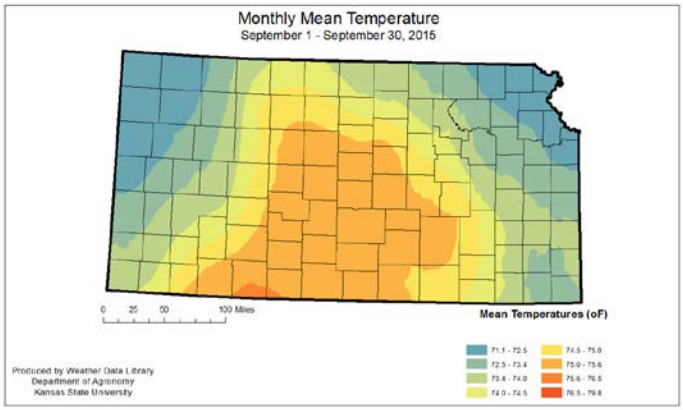
Climate Summary (Temperature and Precipitation)

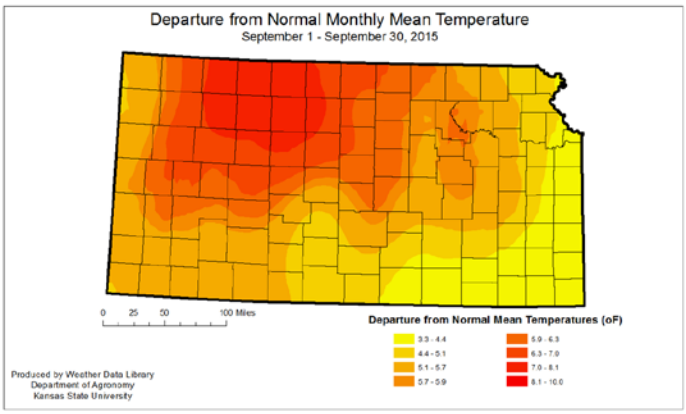
Temperatures were warmer than normal across the state in September. The state-wide average temperature was 73.8^{o} F, 5.7 degree warmer than normal for the month. There were 10 new record daily high temperatures set during the month, and 16 records tied. None of the records were new daily highs for the month. In contrast, there were no record cold high temperatures. On the low temperature side, the same trend prevailed with 34 new record warm minimum temperatures and 25 records tied. The 75° F at Toronto Lake, reported on the 8th, tied for a record warm minimum temperature in September. There was 1 new record daily cold minimum temperature for the month, but no new monthly record lows set. The South Central and Southeast divisions were the closest to normal, with the South Central division averaging 4.9^{o} F warmer than normal and the Southeast Division averaging 3.9 ^{o} F warmer than normal. The Northwest Division was the warmest averaging 72.1^{o}F, or 6.9 degrees warmer than normal. The warmest reading was 107°F and was recorded on the 7th at Hays, Ellis County (NWS). The coolest reading for the state was 33° F at Brewster, Thomas County (NWS) on the 19th. The warmer-than-average temperatures allowed late-planted spring crops such as corn and soybeans to progress rapidly in development. Concerns now are for the dry conditions, with winter planted crops needing moisture for establishment before winter.

The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

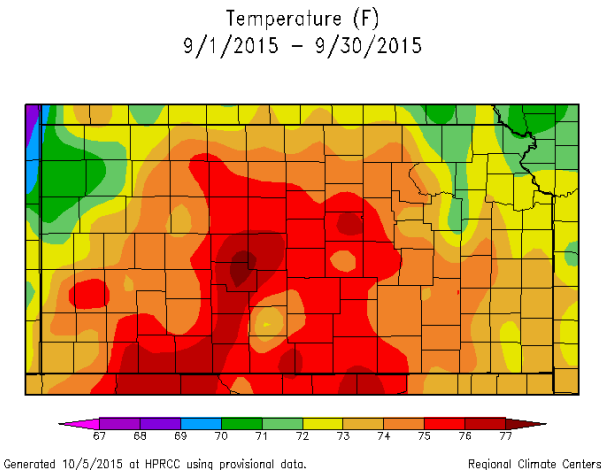
	Kansas Climate Division Temperature Summary (^{o}F)							
	September 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	87.6	56.6	72.1	6.9	102	4	33	19
West Central	88.8	57.2	73.0	6.6	102	7	36	19
Southwest	89.3	60.0	74.7	6.0	104	7	43	19
North Central	86.6	61.5	74.1	6.2	104	7	44	29
Central	87.7	62.8	75.3	6.2	107	7	46	12
South Central	87.7	62.5	75.1	4.9	104	6	32	20
Northeast	84.2	61.9	73.0	5.6	99	7	44	30
East Central	84.5	62.3	73.4	5.2	101	7	46	12
Southeast	84.5	62.6	73.5	3.9	99	8	43	20
STATE	86.8	60.8	73.8	5.7	107	7th	32	20th
Data Source: KSU Weather Library								

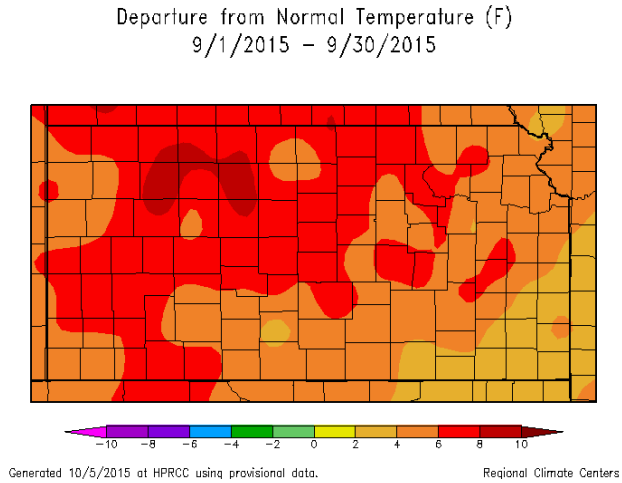
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.



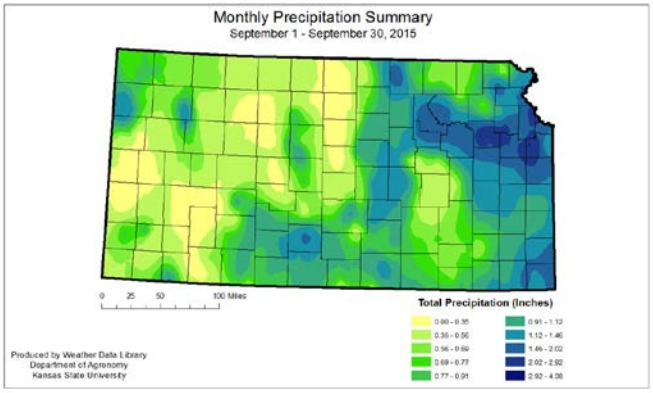


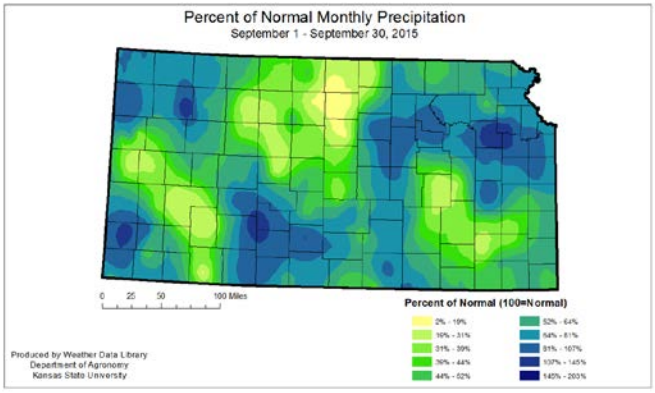
September was drier than normal in most of the state. State-wide average precipitation was 1.58 inches or 53 percent of normal. The North Central Division of the state saw the lowest percent of normal precipitation at 39 percent or an average of 1.04 inches. The West Central Division wasn't far ahead with 42 percent of normal or an average of 0.71 inches. The East Central Division was closest to normal with an average of 2.85 inches or 75 percent of normal. This ranks as the 25th driest September on record, placing it in the lower third of the 121 year distribution. The greatest monthly precipitation totals reported were 7.70 inches at Lecompton, Douglas County (NWS) and 8.02 inches at Topeka 4.6 ESE, Jefferson County, (CoCoRaHS). Still, 16 daily precipitation records were set in September. Lecompton's record of 4.36 inches, reported on the 8th, also set a new record for the station in September. The previous record was 4.14 inches set on September 9, 1989.

Kansas Climate Division Precipitation Summary (inches) - Summary September 2015												
	September 1-30, 2015			January 1–September 30, 2015			April 1–September 30, 2015			September 1–September 30, 2015		
Climate Division	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	0.89	-0.63	61	16.34	-2.07	88	15.78	-0.33	97	0.89	-0.63	61
West Central	0.71	-0.89	42	17.05	-0.84	95	16.17	0.77	105	0.71	-0.89	42
Southwest	0.92	-0.70	52	21.90	4.84	127	20.08	5.40	136	0.92	-0.70	52
North Central	1.04	-1.59	39	21.54	-2.38	88	20.21	-0.24	97	1.04	-1.59	39
Central	1.35	-1.16	51	22.00	-2.99	86	20.51	-0.53	96	1.35	-1.16	51
South Central	1.90	-0.70	74	27.33	1.26	104	25.69	4.25	119	1.9	-0.70	74
Northeast	2.61	-1.00	70	30.76	1.49	104	28.56	3.49	113	2.61	-1.00	70
East Central	2.85	-0.81	75	29.62	-1.64	93	27.48	1.14	103	2.85	-0.81	75
Southeast	1.78	-2.23	44	30.62	-2.80	91	28.59	1.17	104	1.78	-2.23	44
STATE	1.53	-1.09	56	24.21	-0.41	98	22.63	1.86	109	1.53	-1.09	56

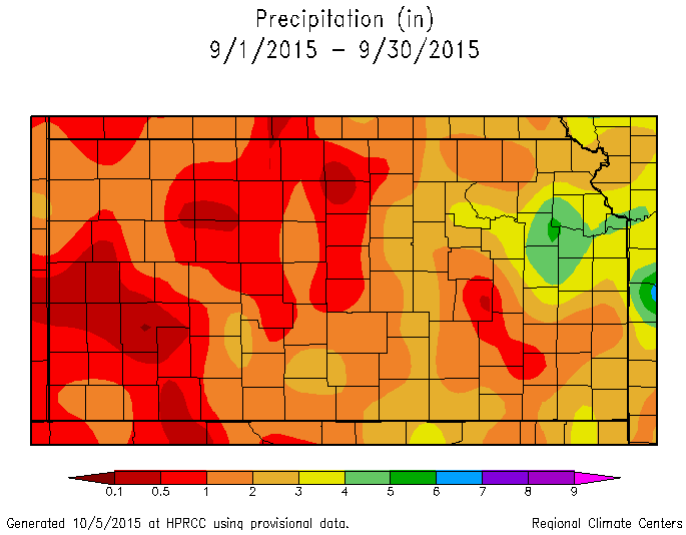
Severe weather was higher in September, despite the dry conditions. Preliminary data indicates there were 5 tornadoes reported. There were 63 hail reports and 64 damaging wind reports.

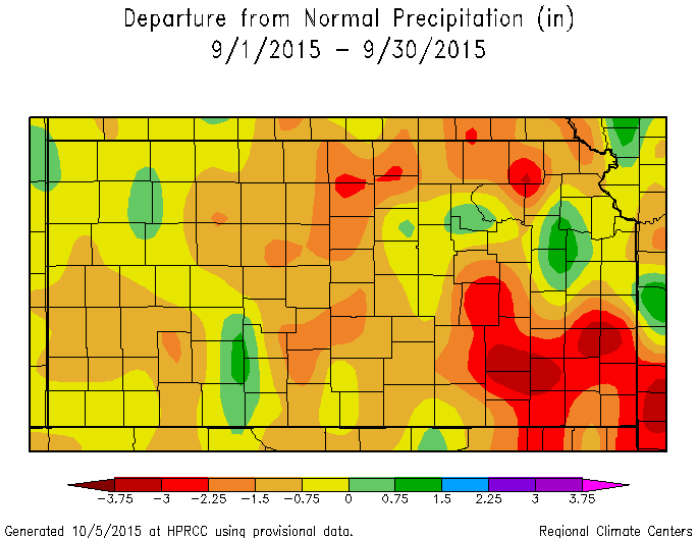
Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.

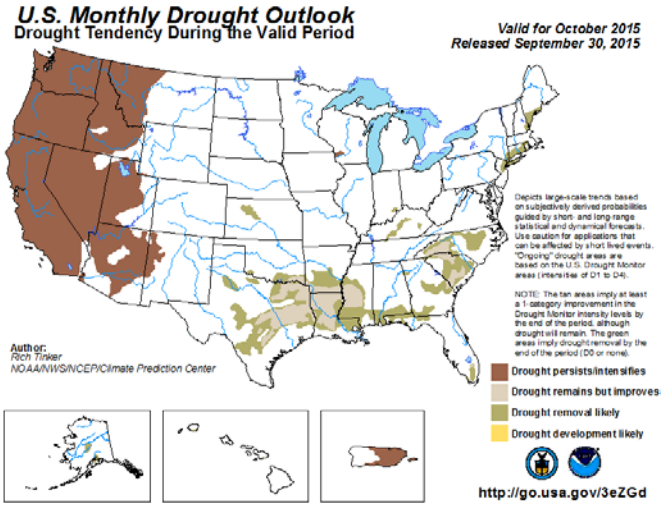


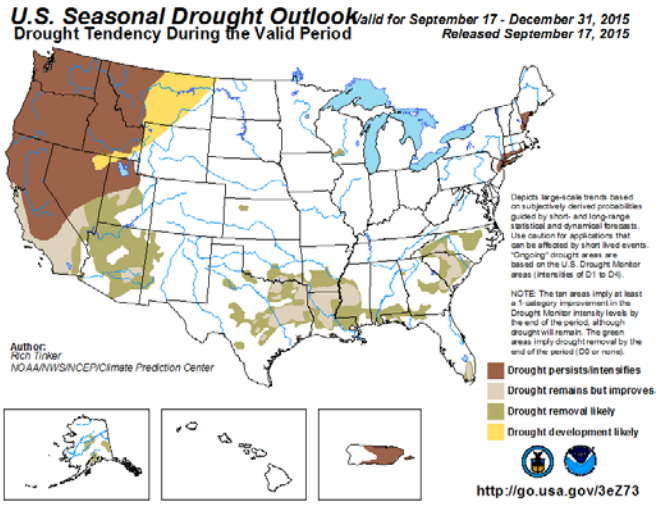


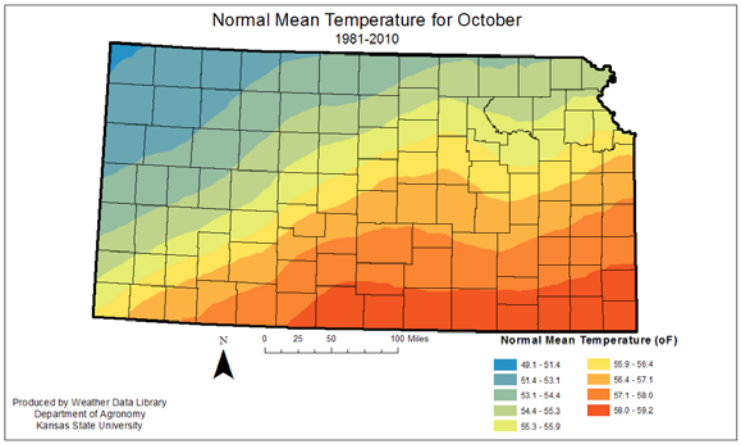
Future Outlook

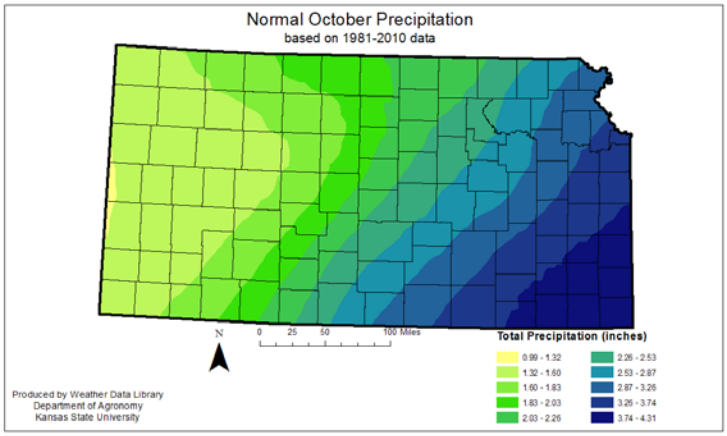
The drought outlook is for improving conditions, but the precipitation outlook for October is neutral.

The Drought Outlook for the month of October and the Season Outlook for Mid-September through the end of December are provided below.

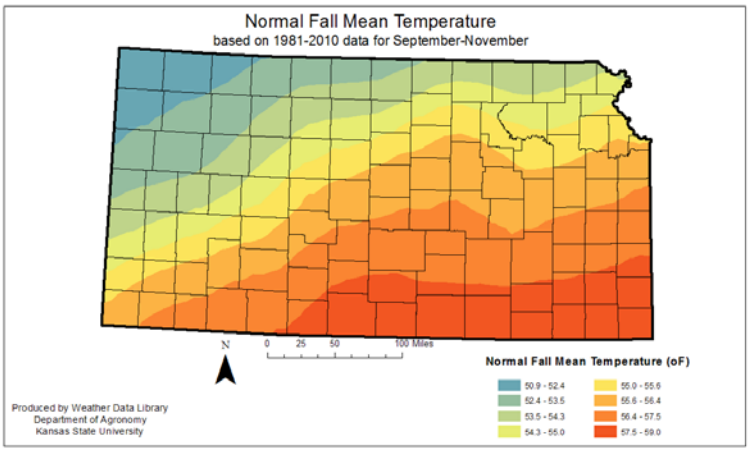


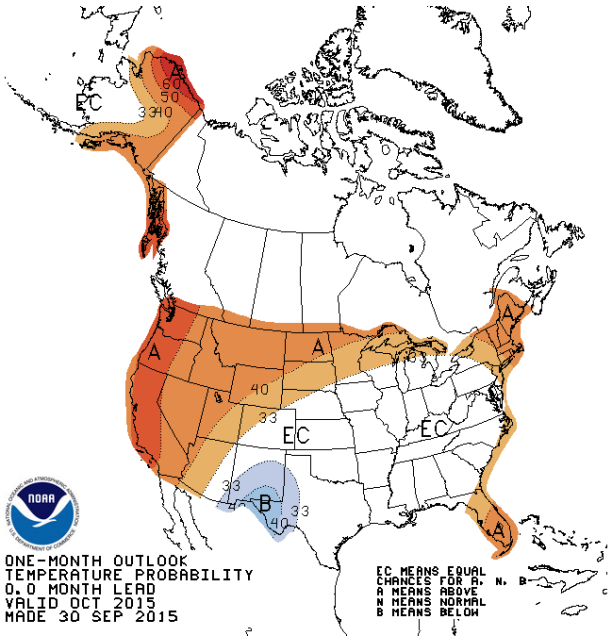


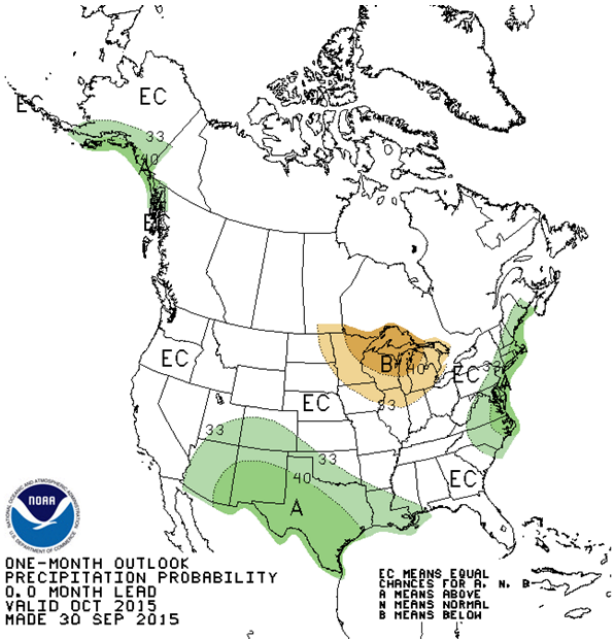


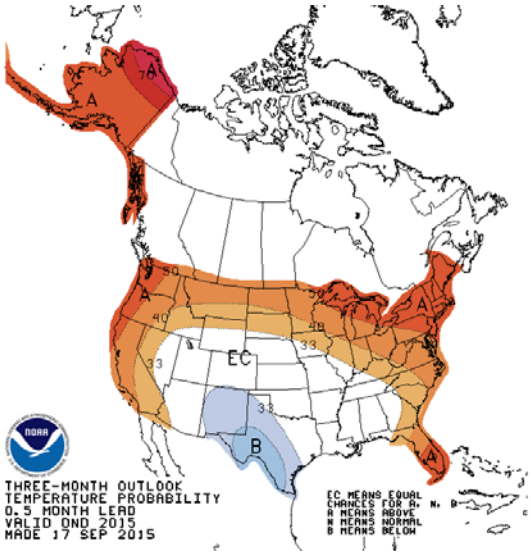


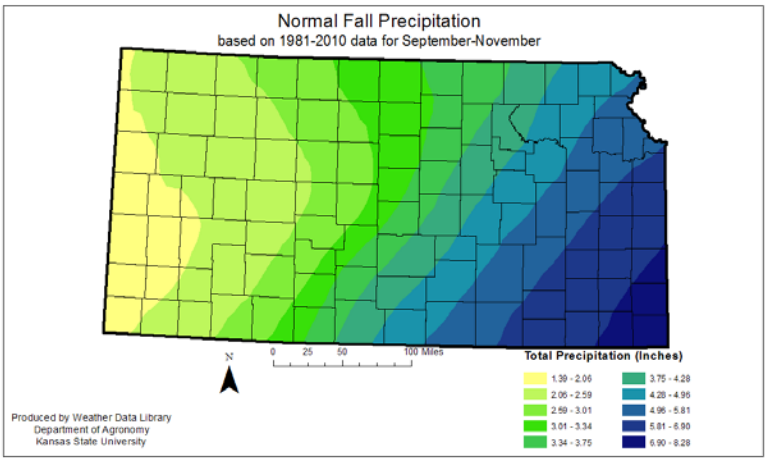
The fall (three-month) outlook favors below normal temperatures and above normal precipitation for September through November.

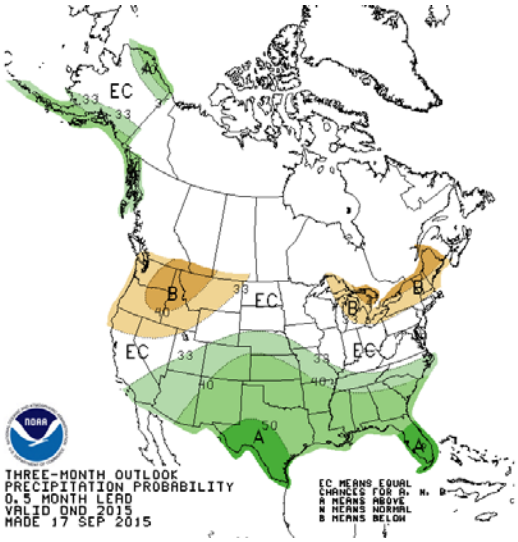












Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Effective Monday, June 29, 2015 mandatory Stage III water restrictions are in place for **Russell** water customers. The water restrictions include a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Surface Water Supply Conditions

The conservation pools at the water supply reservoirs in eastern Kansas are full. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool. Wilson Reservoir is also relatively low at only 67% of conservation pool.

Kansas River basin: Inflows in September were low to moderate for Milford, Tuttle Creek, Perry, and Clinton reservoirs but all reservoirs retained some flood pool storage over the month, with the exception of Tuttle Creek. Tuttle was lowered to facilitate some minor repair work to the outlet works. Flows in the Kansas River were below median values for the majority of the month.

Marais des Cygnes basin: Pomona and Melvern reservoirs both experienced a decline over the month due to lack of inflow. However, flows in the Marais des Cygnes generally exceeded median values with several healthy runoff events. Additionally, Hillsdale received sufficient inflow and to raise the pool elevation for than 1.5 feet above multipurpose elevation. Over-all storage in the reservoirs is healthy.

Cottonwood / Neosho basin: Council Grove, Marion, and John Redmond reservoirs all declined in September and ended the month, essentially, at or below normal conservation pool elevations. Council Grove releases were necessary to support stream flow and demands in the Upper Neosho and John Redmond was drawn down to normal pool while supplying Wolf Creek with 120 cfs the entire month. Stream flow in the Cottonwood and Upper Neosho declined to below median values and the lower Neosho maintained median flow due to releases from John Redmond.

Verdigris basin: Fall River, Toronto, and Elk City reservoirs experienced declining elevations and ended the month at or below normal conservation pool. Releases were necessary to support target flows of Fall River and the Verdigris. Basin flow conditions were relatively low throughout the month.

Saline basin: Wilson Lake level continued to decline, consistently setting new record low levels approaching ten feet below the top of the multipurpose pool elevation. Recreation is significantly impacted and the Wilson Lake community has asked for help. The KWO has asked the U.S. Army Corps of Engineers for a reduced minimum release to help mitigate some of the impacts from drought. Reducing the release will not stop the lake level from declining, due to the lack of inflow, but it is the only available action. The Corps of Engineers declined this request in September.

Smoky Hill basin: The majority of the Smoky Hill basin was dry relative to the eastern portion of the state. Kanopolis inflows were low throughout the month of September. Water discharged through the uncontrolled notch the entire month. Downstream flow remained well below the historical median at the USGS gage at Mentor but exceeded the low flow target. Cedar Bluff received very little inflow and steadily declined in September.

Harmful Blue-Green Algal Blooms (lake water safety)
KDHE has issued two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. These notification levels are determined by the concentration of a harmful toxin(s) or the concentration of cyanobacteria cell counts.

Blue-Green Algae Bloom Warning is in effect for Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; Harvey County East Lake, Harvey County; Hiawatha City Lake, Brown County; McPherson County State Fishing Lake, McPherson County; Melvern River Pond, Osage County; Milford Reservoir (zone C), Clay, Dickinson, Geary counties; Nemaha State Fishing Lake, Nemaha County; and Plainville Township Lake, Rooks (October 1, 2015).

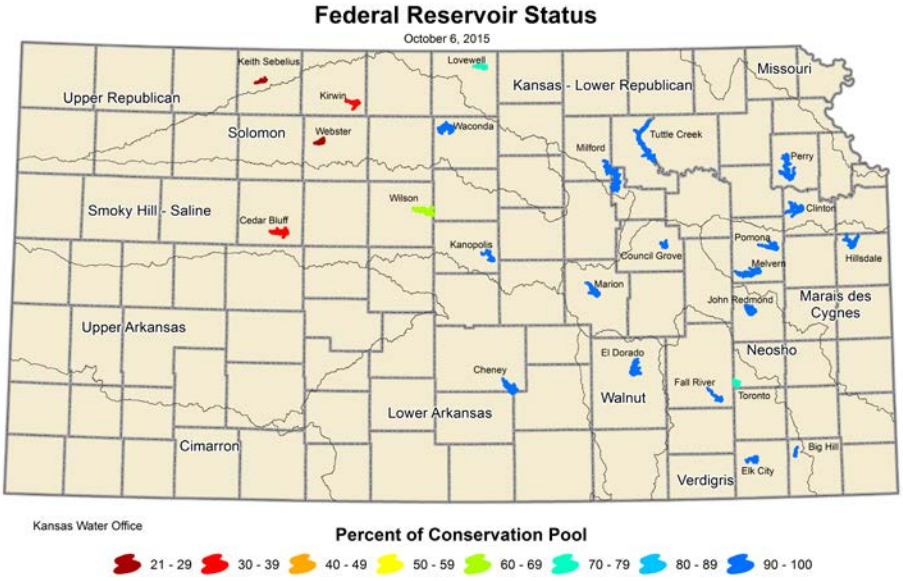
Blue-Green Algae Bloom Watch is in effect for Milford Reservoir (zone B), Geary County (October 1, 2015).

A map of the affected areas can be accessed at https://maps.kdhe.state.ks.us/habkscounty/ .

Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged.

Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect.

General Reservoir Conditions



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**10/06/2015 06:00 AM**		
Norton[1]	2304.3	2287.45	-16.85	26.6
Harlan County, NE	1945.73	1931.26	-14.47	48.6
Lovewell[1]	1582.6	1579.68	-2.92	77.4
Milford[1]	1144.4	1146.26	1.86	100.0
Cedar Bluff	2144	2119.33	-24.67	32.5
Kanopolis[1]	1463	1463.45	0.45	100.0
Wilson[1]	1516	1506.09	-9.91	67.0
Webster[1]	1892.5	1870.14	-22.31	23.0
Kirwin[1]	1729.3	1712.87	-16.38	35.4
Waconda[1]	1455.6	1455.53	-0.07	99.6
Tuttle Creek[1]	1075	1074.38	-0.62	97.4
Perry[1]	891.5	892.91	1.41	100.0
Clinton[1]	875.5	877.19	1.69	100.0
Melvern[1]	1036	1035.71	-0.29	98.7
Pomona[1]	974	973.85	-0.15	98.9
Hillsdale[1]	917	917.82	0.82	100.0
Arkansas River Basin		**10/06/2015 08:00 AM**		
Cheney	1421.6	1421.23	-0.37	98.0
El Dorado	1339	1338.69	-0.31	99.0
Toronto[1]	901.5	900.32	-1.18	75.0
Fall River[1]	948.5	947.88	-0.62	91.0
Elk City[1]	796	795.91	-0.09	100.0
Big Hill	858	857.77	-0.23	99.0
Council Grove[1]	1274	1273.30	-0.70	96.0
Marion[1]	1350.5	1350.27	-0.23	99.0
John Redmond[1]	1039	1040.95	-0.05	100.0

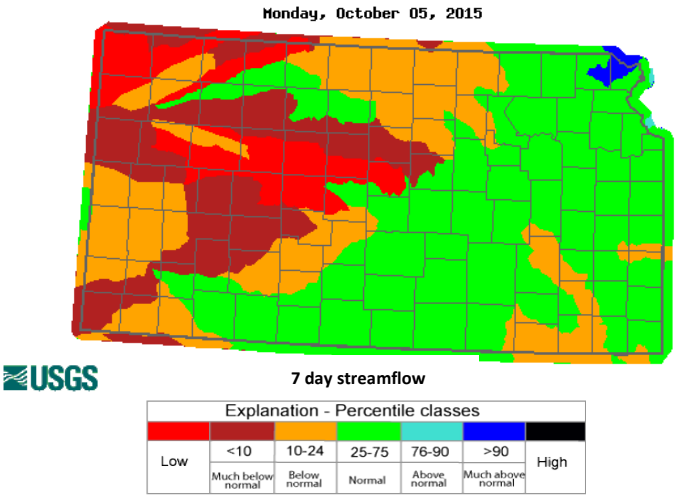
[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

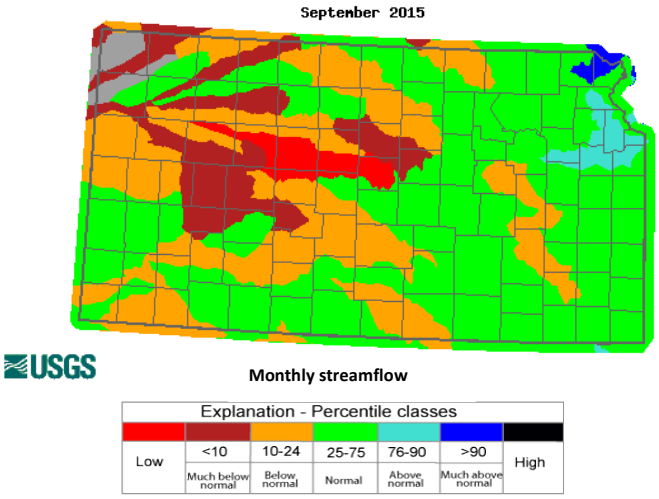
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.

Streamflow Conditions

Kansas streamflows during July varied across the state, but remain below historical normal flows in parts of west and central Kansas.

The comparison of present **7-day** streamflow to historical is shown on the map below left and to the **September** streamflow compared to historical is shown on the map below, right. Short term streamflow is significantly lower than historical average in many area of western Kansas. The longer, nearly monthly average flow was slightly better compared to historical, with mores areas above normal flow due to storm events that produced abnormal local runoff in August in some of these areas.



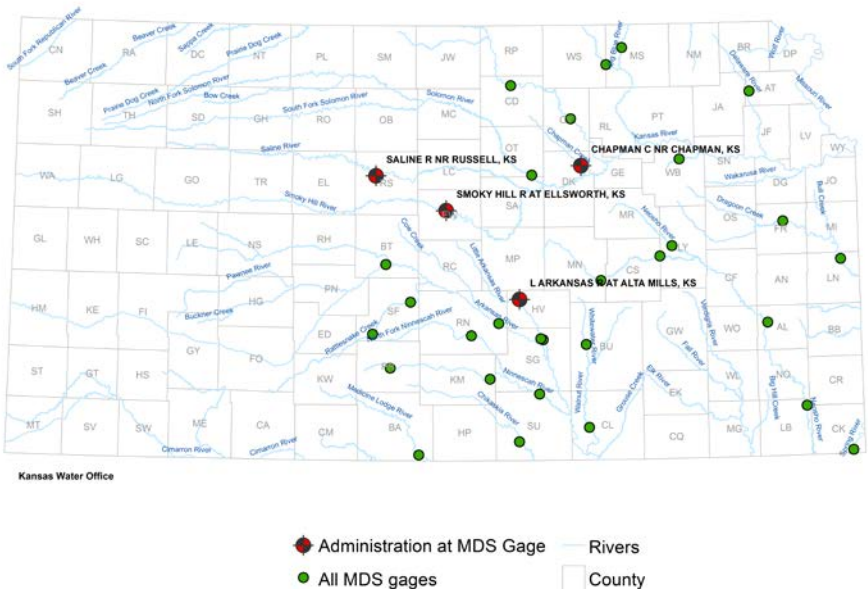


Water Right Administration/Minimum Desirable Streamflow (MDS)

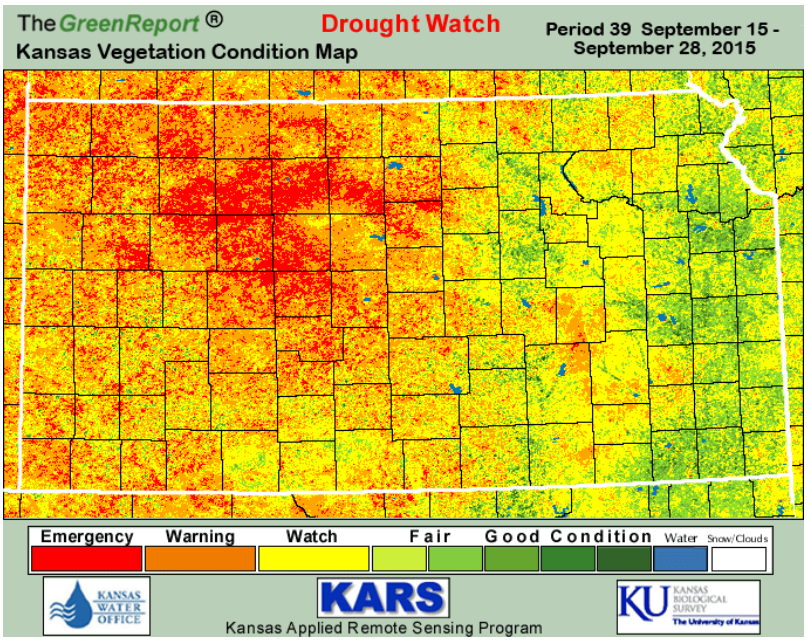
Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

Streamflows in cubic feet per second (cfs)								
Gaging Station	**Flow Sept 3**	**Flow Sept 10**	**Flow Sept 17**	**Flow Sept 24**	**Sept MDS**	**Oct MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	181	170	137	100	80		03/20/15; ceased 05/29/15	
Republican River at Clay Center	259	192	179	133	100		03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	5	2	3	3	15		03/23/15	3
Saline River near Russell	1	1	1	1	2		**9/5/15**	10
Chapman Creek near Chapman	10	8	8	9	10		**9/28/2015**	5
Little Arkansas River at Alta Mills	4	2	2	1	8		**9/14/15**	8

Kansas Minimum Desirable Streamflow (MDS) Gages Administration
October 1, 2015

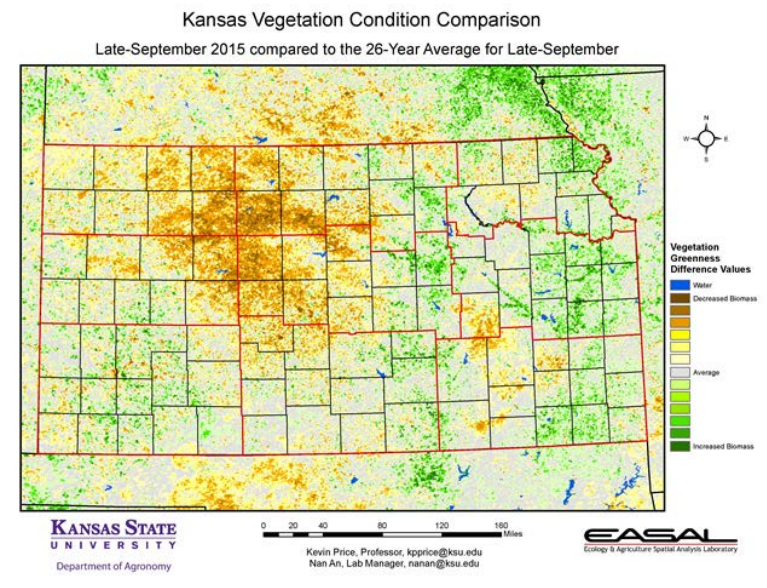


Soil, Crop and Vegetation



Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. The GreenReport indicates that things look normal for this time of year as crops are turning brown. However, dry conditions remain in central and western areas due to lack of rain.

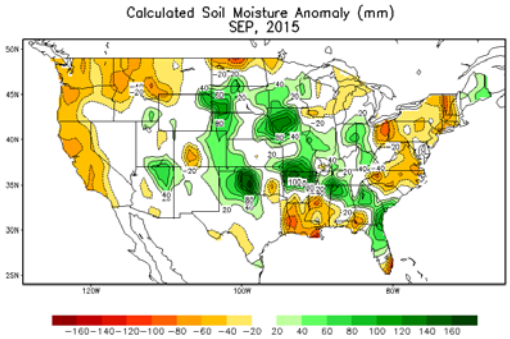


Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for September 15 – September 28 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much of the state continues at or above average photosynthetic activity. The epicenter of below average photosynthetic activity is centered on Graham, Rooks, Trego and Ellis counties. These areas continue to miss most of the storm systems, and moderate drought is expanding in these areas. An area of below average photosynthetic activity is developing in Chase County, as well.

Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.



Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending September 28, 2015 reported topsoil moisture rated 11 percent very short, 32 short, 56 adequate, and 1 surplus. Subsoil moisture rated 11 percent very short, 30 short, 59 adequate, and 0 surplus.

Field Crops:
Corn condition rated 3 percent very poor, 9 poor, 31 fair, 47 good, and 10 excellent.

Soybeans condition rated 2 percent very poor, 8 poor, 33 fair, 48 good, and 9 excellent.

Sorghum condition rated 2 percent very poor, 8 poor, 33 fair, 48 good, and 9 excellent.

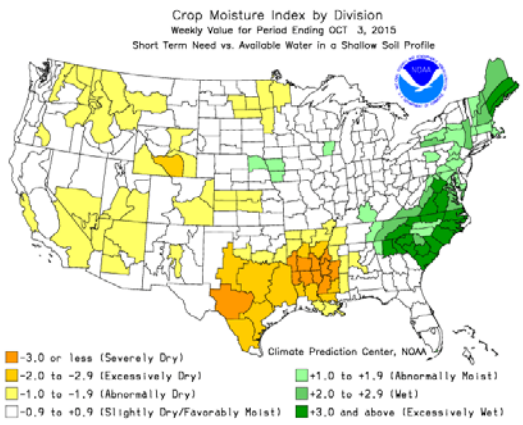
Sunflowers condition rated 1 very poor, 2 poor, 31 fair, 57 good, and 9 excellent.

Alfalfa fourth cutting was 80 percent, ahead of 68 last year and 64 average.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 3 very poor, 10 poor, 34 fair, 45 good, and 8 excellent.

Stock water supplies rated 3 percent very short, 12 short, 84 adequate, and 1 surplus.
(http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.



Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at:
http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:
http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

September 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	1.13	-0.01	99%	69.5	6.2	96 (14)	35 (19)
Dodge City	1.01	-0.66	60%	74.2	5.0	100 (7,2)	43 (19)
Garden City	0.11	-1.36	7%	74.2	6.0	101 (16)	43 (19)
Goodland	1.03	-0.19	84%	71.0	6.4	98 (3)	35 (19)
Guymon, OK	1.00	-0.79	56%	75.3	4.9	101 (14)	50 (19)
Hill City	0.36	-1.52	19%	75.4	8.0	103 (15)	47 (30,19)
Lamar, CO	0.52	-0.73	42%	72.7	6.2	100 (14)	45 (19)
McCook, NE	1.10	-0.34	76%	72.5	8.1	102 (3)	39 (19)
Springfield, CO	0.16	-1.17	12%	71.1	5.0	97 (7,2)	45 (19)
Central							
Concordia	1.21	-1.70	42%	74.1	6.1	100 (6)	45 (30)
Hebron, NE	0.95	-1.97	33%	72.4	6.5	100 (6)	44 (30)
Medicine Lodge	1.53	-0.57	73%	76.4	5.2	104 (7)	52 (19)
Ponca City, OK	1.34	-1.95	41%	76.3	4.2	100 (7)	50 (12)
Salina	1.67	-1.03	62%	76.7	6.5	101 (7,6)	50 (19)
Wichita (ICT)	2.13	-1.01	68%	76.5	5.5	102 (7)	53 (12)
East							
Bartlesville, OK	1.53	-2.31	40%	73.3	2.0	97 (7)	47 (12)
Chanute	1.29	-2.38	35%	73.0	3.1	92 (6)	48 (12)
Fall City, NE	1.73	-1.82	49%	72.6	5.9	98 (6)	47 (12)
Johnson Co. Exec. Apt	2.67	-1.84	59%	71.4	2.8	91 (6)	50 (12)
Joplin, MO	1.12	-3.83	23%	73.4	2.6	93 (7)	48 (12)
Kansas City (MCI), MO	5.73	1.11	124%	72.9	4.7	95 (6)	48 (30)
St. Joseph, MO	2.04	-1.38	60%	71.5	4.9	94 (6)	45 (12)
Topeka (TOP	7.43	3.77	203%	73.3	5.0	96 (6)	49 (12)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – October 2015 Summary

Climate, Drought Conditions and Responses for Kansas

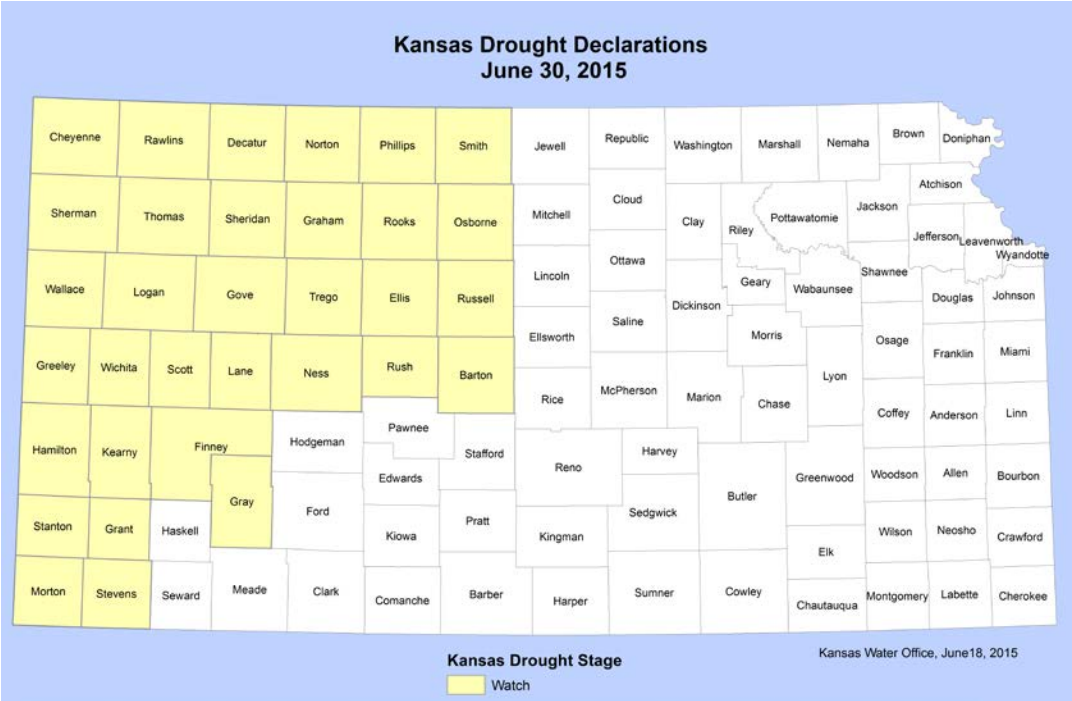
General

- June 29, 2015, Executive Order (EO) 15-04 issued by Governor for a drought watch for 33 counties.
- The US Drought Monitor indicated dry conditions expanded and worsened through October. By the end of the month 75 percent of Kansas was considered abnormally dry and over 14 percent was in moderate drought.
- Fire hazard become significant many October days.
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, due to drought. An additional 14 contiguous counties are also eligible federal for assistance.
- USDA declared three Kansas Counties Primary disaster areas due to tornados, excessive rain, flooding or high winds. An additional 18 contiguous counties are also eligible for federal assistance.
- Disaster declaration by the President issued for severe storms, tornados, straight line winds and flooding May 4-June 21, 2015. This makes disaster aid available through Federal Emergency Management Agency (FEMA).

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration was in effect on the Saline and Smoky Hill rivers throughout October. Administration and ceased on Chapman Creek on October 22.
- Blue-Green Algae Bloom Warning is in effect for Hiawatha City Lake, Brown County; Milford Reservoir (Zone C is closed); and Plainville Township Lake, Rooks County (Oct. 30, 2015).
- Blue-Green Algae Bloom Watch is in effect for Milford Reservoir (Zone B) (Oct. 30, 2015).

Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.

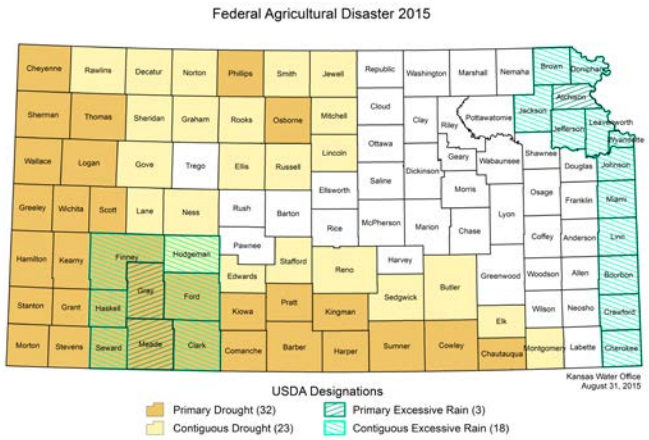


Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal Drought: USDA has designated 32 Kansas counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper,

Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Osborne, Phillips, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 23 contiguous counties are also eligible for natural disaster assistance. These are Butler, Decatur, Edwards, Ellis, Elk, Gove, Graham, Hodgeman, Jewell, Lane, Lincoln, Mitchell, Ness, Norton, Rawlins, Reno, Rooks, Russell, Sheridan, Smith, Stafford, Sumner and Montgomery.



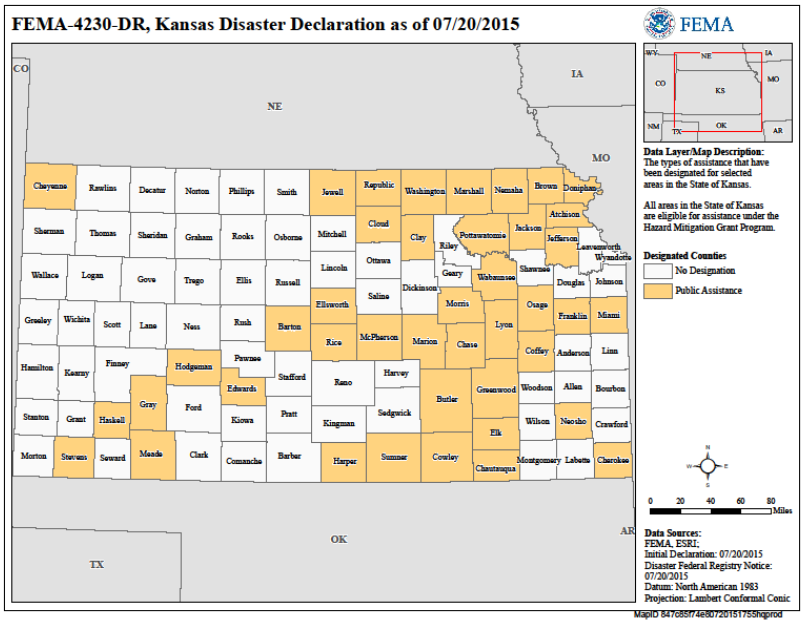
Federal Other: USDA has designated three Kansas counties as Primary Disaster Areas for 2015 due to tornados, high winds, excessive rain or flooding. These are Atchison, Gray and Meade. In addition 18 Kansas counties, contiguous to primary disaster counties are also eligible for natural disaster assistance. These are Bourbon, Brown, Cherokee, Clark, Crawford, Doniphan, Finney, Ford, Haskell, Hodgeman, Jackson, Jefferson, Johnson, Leavenworth, Linn, Miami, Seward and Wyandotte.

Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at: http://www.fema.gov/news/disasters.fema.

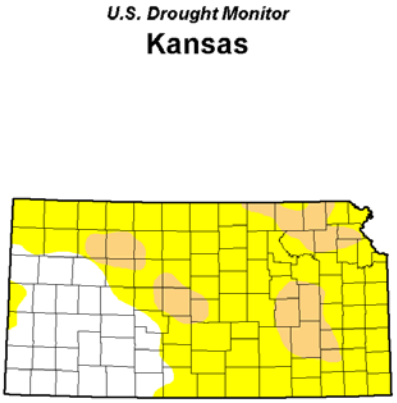


July 20, 2015 the President declared disaster for Kansas areas affected by severe storms, tornadoes, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The President's action makes federal funding available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the severe storms, tornadoes, and flooding in the counties of Atchison, Barton, Brown, Butler, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Cowley, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Harper, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Marion, Marshall, McPherson, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Rice, Stevens, Sumner, Wabaunsee, and Washington.

Federal funding is available on a cost-sharing basis for hazard mitigation measures statewide. More information may be found at http://www.fema.gov/news-release/2015/07/20/federal-aid-programs-state-kansas-declaration.

General Conditions

Drought conditions continued to deteriorate, particularly in the eastern third of the state. This was not unexpected, given the lower than average precipitation in the area. Moderate drought conditions shifted eastward, and the area of abnormal dry conditions expanded. The moderate drought ranges from Northwest Kansas through parts of Central Kansas. A return to normal or above normal precipitation is needed to sustain improvements. More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.



October 27, 2015
(Released Thursday, Oct. 29, 2015)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

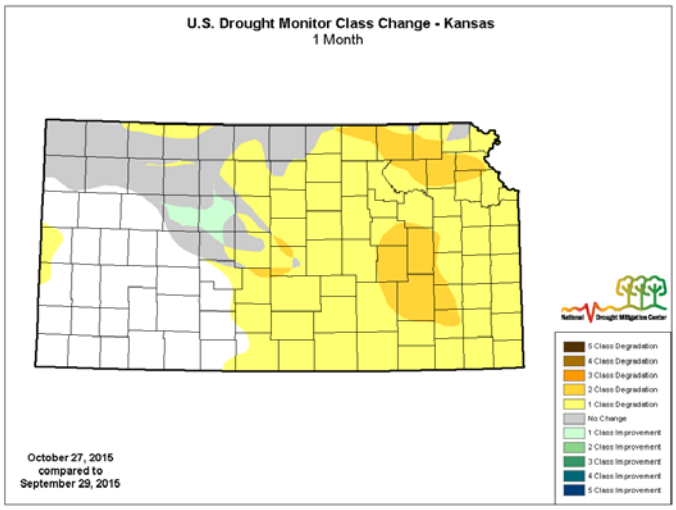
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	25.31	74.69	14.29	0.00	0.00	0.00
Last Week 10/20/2015	31.10	68.90	9.57	0.00	0.00	0.00
3 Months Ago 7/28/2015	68.33	31.67	3.49	0.00	0.00	0.00
Start of Calendar Year 12/29/2014	19.49	80.51	37.49	18.30	2.25	0.00
Start of Water Year 9/29/2015	80.79	19.21	4.48	0.00	0.00	0.00
One Year Ago 10/30/2014	32.99	67.01	37.50	19.49	2.25	0.00

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

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

Author:
Brad Rippey
U.S. Department of Agriculture

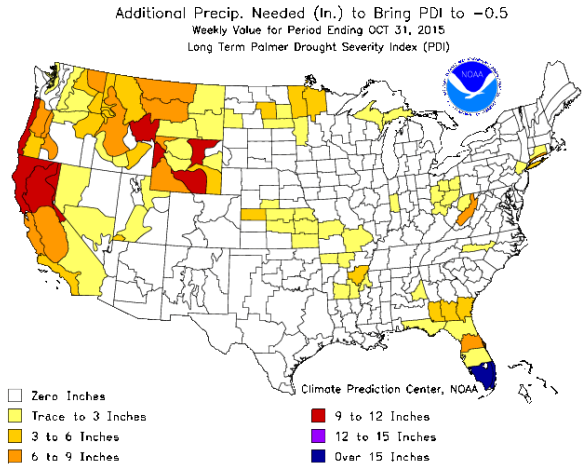
http://droughtmonitor.unl.edu/



http://droughtmonitor.unl.edu

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought. Note the Northwest Climate division continues to lack moisture.



Climate Division	Precipitation needed to End Drought (inches)			
	Week ending October 10	Week ending October 17	Week ending October 24	Week ending October 31
Northwest	5.59	5.79	4.81	3.38
West Central	1.16	1.43	-	-
Southwest	-	-	-	-
North Central	2.09	2.41	2.12	1.16
Central	2.50	2.93	2.92	2.02
South Central	-	-	-	-
Northeast	-	1.40	2.82	1.16
East Central	0.96	2.45	3.17	1.86
Southeast	-	1.32	2.31	1.59

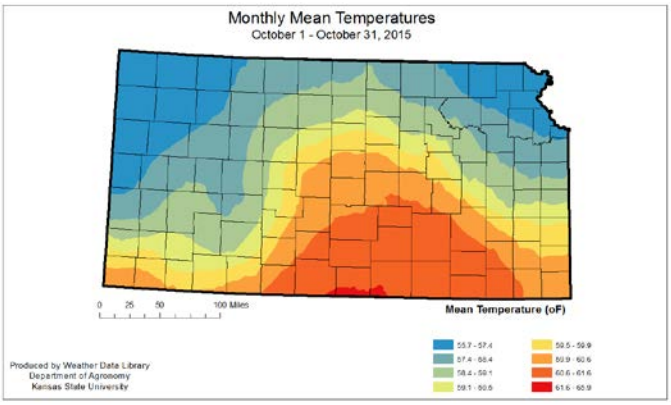
Climate Summary (Temperature and Precipitation)

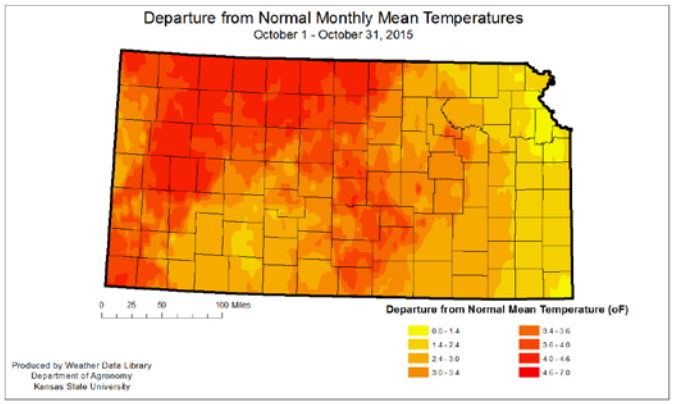
Temperatures were warmer than normal across the state, although not as warm as in September. The state-wide average temperature was 58.6 oF, or 3 degree warmer than normal for the month. There was only one new record daily high temperature set during the month, and 3 records tied. No new daily highs were set for the month. In contrast, there were 3 record cold high temperatures. Most of the warmth showed in the low temperature side. There were 18 new record warm minimum temperatures and 13 records tied. None of these set new records for the month. No new daily cold minimum temperatures were set for either a day or for the month. The Northeast and Southeast divisions were the closest to normal, with the Northeast division averaging just 1.2 oF warmer than normal and the Southeast Division averaging 1.9 oF warmer than normal. The Northwest Division was the warmest averaging 56.4 oF, or 4.2 degrees warmer than normal. The warmest reading was 98 oF, reported at Lakin in Kearny County on the 12th. The coolest reading for the state was 21 oF at Atwood in Rawlins County on the 30th. The warmer-than-average temperatures allowed late-planted spring crops such as corn and soybeans to finish development. Concerns now are for the dry conditions, with winter planted crops needing moisture to complete establishment before winter.

The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

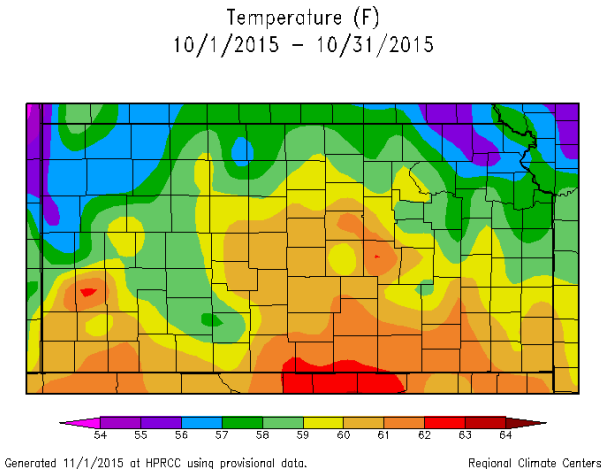
	Kansas Climate Division Temperature Summary (^{o}F)							
	October 2015							
	Maximum	**Minimum**	**Average**	**Departure**	**High**	**Date**	**Low**	**Date**
Northwest	70.9	41.9	56.4	4.2	96	12	21	30
West Central	71.5	43.1	57.3	3.8	97	12	25	29
Southwest	72.5	46.7	59.6	3.6	98	12	30	25
North Central	71.9	45.1	58.5	3.4	96	12	25	29
Central	73.0	46.2	59.6	3.3	96	12	26	30
South Central	74.1	48.2	61.2	3.5	93	11	30	30
Northeast	70.6	42.6	56.6	1.2	91	12	23	30
East Central	71.1	45.9	58.5	2.2	91	12	26	30
Southeast	72.3	47.2	59.8	1.9	90	12	29	30
STATE	72.0	45.2	58.6	3.0	98	12th	21	30th
Data Source: KSU Weather Library								

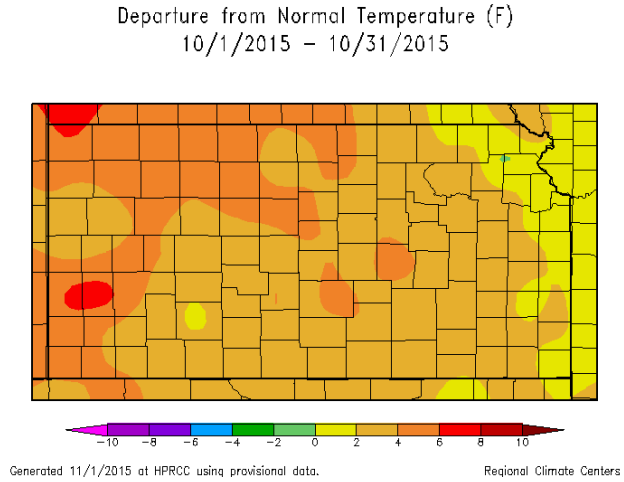
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.

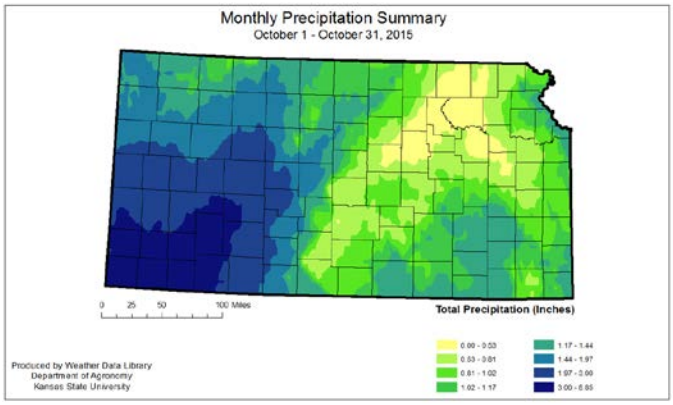


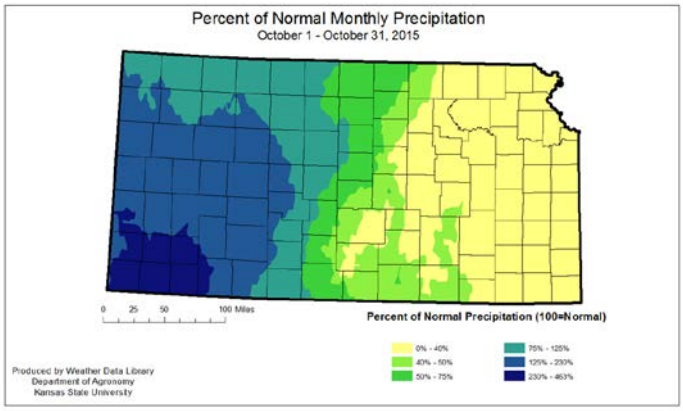


State-wide average precipitation was 1.71 inches, which was 91 percent of normal. It also falls squarely in the middle of the 1895-2015 data. Unfortunately, the distribution wasn't very even. The western third of the state fared the best, with the Southwest Division as the wettest. The divisional average was 4.05 inches or 265 percent of normal. In contrast, the Southeastern Division averaged only 0.81 inches or 26 percent of normal. Another factor was the distribution of events across the month. The western areas of the state saw several events above a quarter of an inch. For most of the eastern areas of the state, rainfall above a tenth of an inch fell only on the last day of the month. The greatest monthly precipitation totals reported were 8.85 inches at Liberal, Seward County (NWS) and 5.00 inches at Hugoton, Stevens County, (CoCoRaHS). Still, 12 daily precipitation records were set in October. Nine of those records were established in western locations.

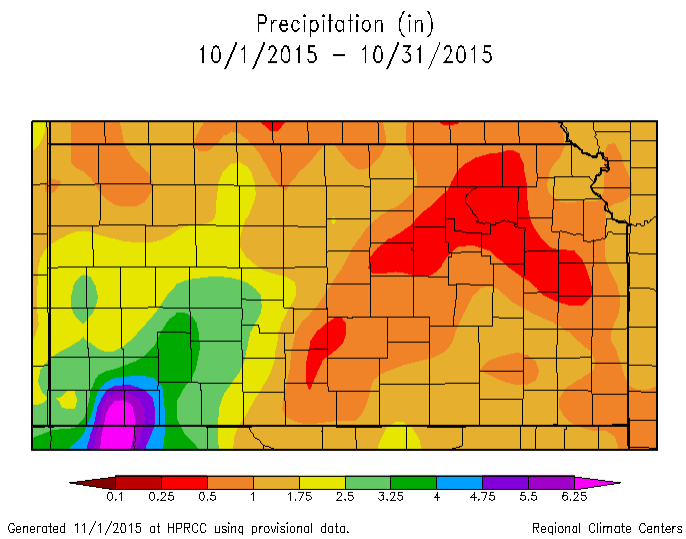
Kansas Climate Division Precipitation Summary (inches) - Summary October 2015												
	October 1-31, 2015			January 1– October 31, 2015			April 1– October 31, 2015			September 1–October 31, 2015		
Climate Division	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	1.48	-0.08	94	17.97	-1.99	90	17.40	-0.26	98	2.52	-0.56	82
West Central	2.05	0.59	138	19.08	-0.27	98	18.20	1.35	108	2.74	-0.32	88
Southwest	4.05	2.53	265	25.88	7.30	138	24.07	7.87	147	4.9	1.76	152
North Central	1.11	-0.87	57	22.62	-3.28	86	21.29	-1.14	93	2.12	-2.49	47
Central	1.22	-0.91	62	23.16	-3.97	84	21.67	-1.50	92	2.51	-2.14	54
South Central	1.48	-1.16	57	28.85	0.14	100	27.20	3.12	113	3.42	-1.82	66
Northeast	0.82	-1.91	32	31.58	-0.42	98	29.38	1.59	105	3.42	-2.92	53
East Central	0.83	-2.26	26	30.41	-3.94	87	28.26	-1.17	95	3.64	-3.11	52
Southeast	1.45	-2.22	39	32.00	-5.09	85	29.97	-1.12	96	3.15	-4.53	41
STATE	1.71	-0.61	91	25.91	-1.02	97	24.32	1.23	106	3.23	-1.71	73

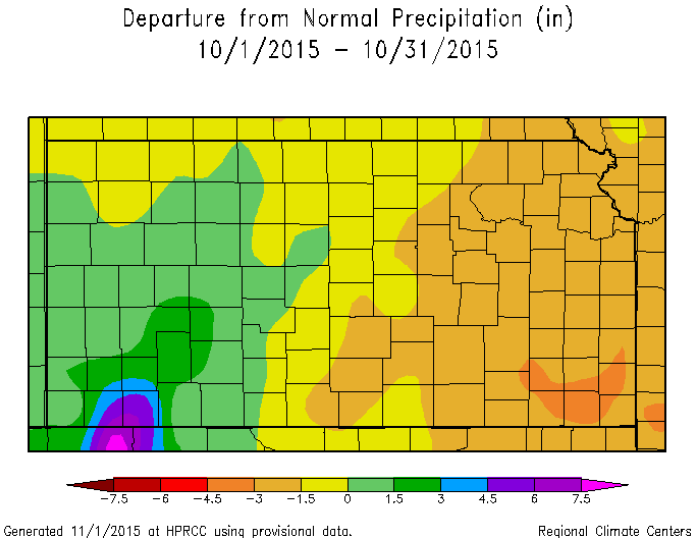
Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.





Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.



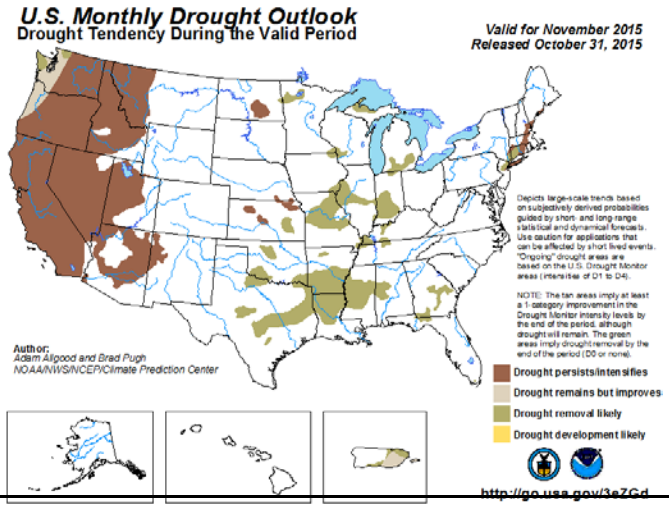


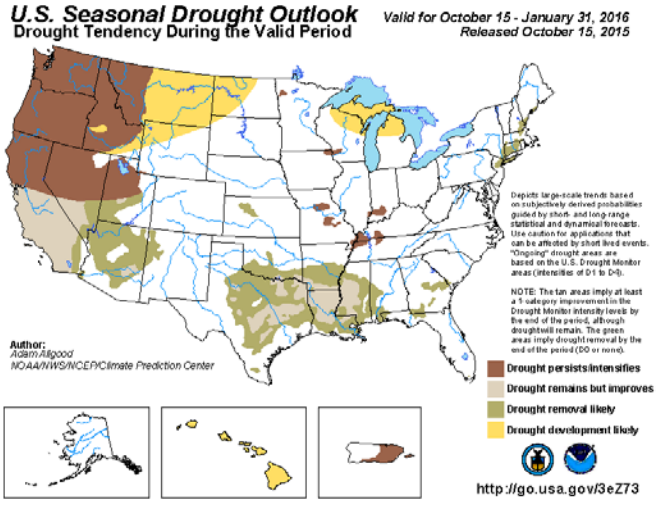
With the limited rainfall, severe weather was also limited. Preliminary data indicates there were no tornadoes reported, nor any hail reports. There were 5 reports of damaging wind, mostly in the Southwest Division.

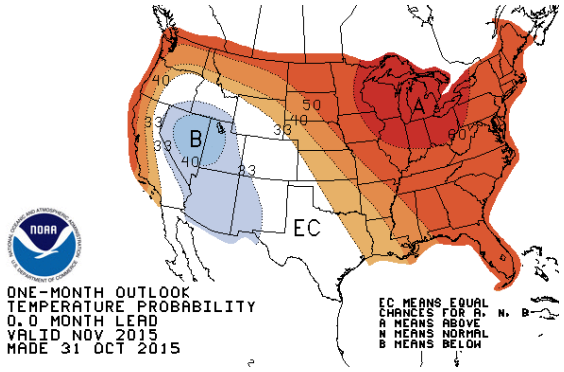
Future Outlook

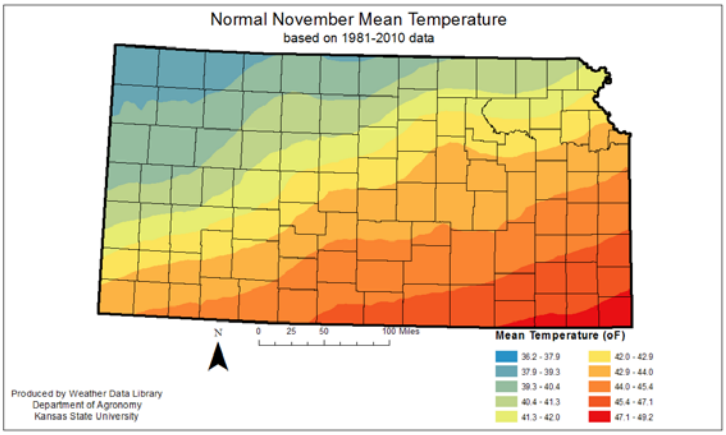
The drought outlook is for improving conditions, and the precipitation outlook for November is positive. However, we are moving into a drier period of the year, so even above normal precipitation will be slow to erase the dry conditions. Above normal precipitation is favored for November, with above normal temperature also favored.

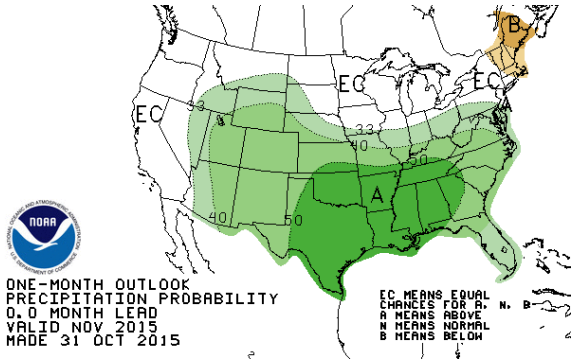
The Drought Outlook for the month of November and the Season Outlook for Mid- October through the end of January 2016 are provided below.

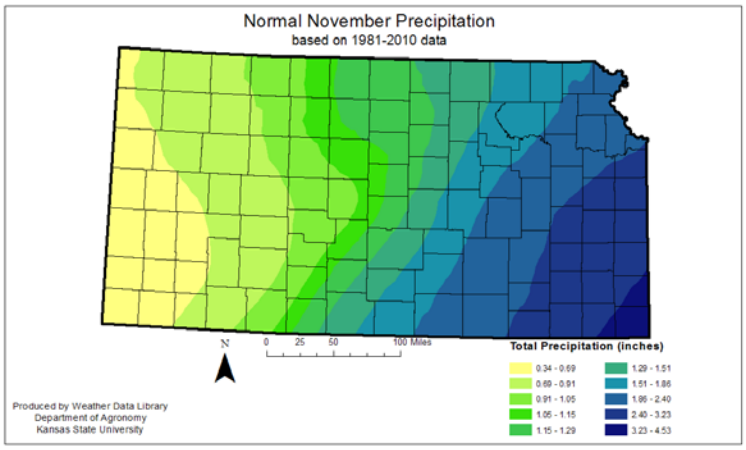




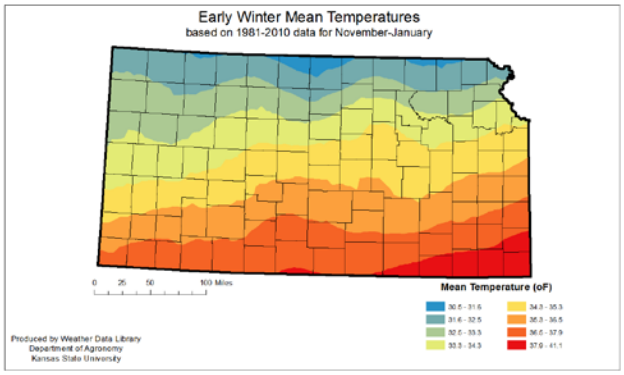


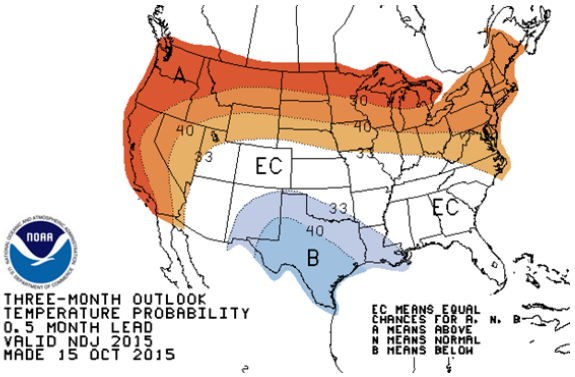


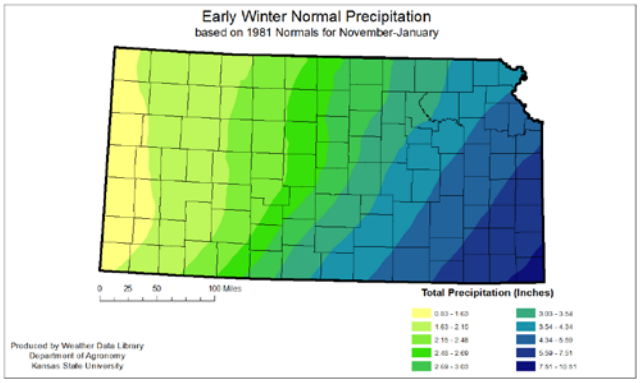


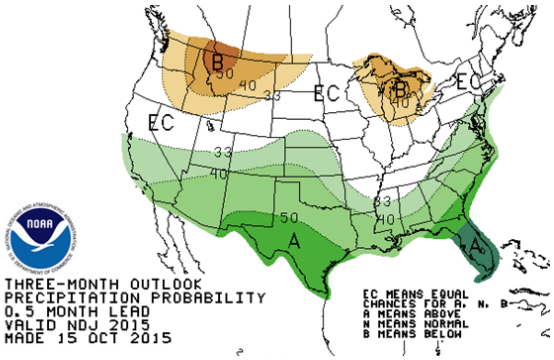


The early winter (three-month) outlook favors normal temperatures and above normal precipitation for November 2015 through January 2016.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Known issues:
Stage II water restrictions are in place for **Russell,** Russell County water customers. The water restrictions include a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Stage III water restrictions are in place for **Victoria**, Ellis County.

The City of **Natoma** in Osborne County reported to KDHE declining well water levels causing inability to pump 2 of three wells. Water conservation plan enactment was recommended.

Surface Water Supply Conditions

Kansas River basin: Inflows in October were low for Milford, Tuttle Creek, Perry, and Clinton reservoirs but all reservoirs retained some flood pool storage over the month, with the exception of Tuttle Creek Reservoir. Tuttle was lowered to facilitate some minor repair work to the outlet works. Flows in the Kansas River were below median values for the entire month.

Marais des Cygnes basin: Pomona, Melvern, and Hillsdale reservoirs experienced a decline over the month due to lack of inflow. Flows in the Marais des Cygnes River remained well below median values. Over-all reservoir storage is reasonably healthy but water right administration and protection of releases were necessary to maintain minimum in-stream flow needs. Surface water demands are high, primarily for use in waterfowl habitat.

Cottonwood / Neosho basin: Council Grove, Marion, and John Redmond reservoirs all declined in October and ended the month below normal conservation pool elevations. Council Grove releases were necessary to support stream flow and demands in the Upper Neosho drainage. Stream flow in the Cottonwood and Upper Neosho drainages were below median values. Flows in the Lower Neosho remained below median values and diminished to levels less than the Minimum Desirable Streamflow (MDS) at Parsons. Surface water demands are high, primarily for use in waterfowl habitat.

Verdigris basin: Fall River, Toronto, and Elk City reservoirs experienced declining elevations and ended the month below normal conservation pool. Releases were necessary to support target flows of Fall River and the Verdigris River. Basin flow conditions were relatively low throughout the month.

Saline basin: Wilson Lake level continued to decline, consistently setting new record low levels more than ten feet below the top of the multipurpose pool elevation. Recreation is significantly impacted.

Smoky Hill basin: The Smoky Hill basin was dry throughout the month of October. Kanopolis Reservoir inflows remained very low. Water discharged through the uncontrolled notch until the level fell below multipurpose elevation and the service gate was opened to maintain releases. Downstream flow remained well below the historical median at the USGS gage at Mentor but exceeded the low flow target. Cedar Bluff Reservoir received very little inflow and steadily declined in October.

Harmful Blue-Green Algal Blooms (lake water safety)

KDHE has issued two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. These notification levels are determined by the concentration of a harmful toxin(s) or the concentration of cyanobacteria cell counts.

Throughout the month of October numerous lakes were affected, some moving between warning and watch.
This included:

October 30, 2015: Blue-Green Algae Bloom Warning is in effect Hiawatha City Lake, Brown County; Milford Reservoir (Zone C) closure, Clay, Dickinson and Geary County; and Plainville Township Lake, Rooks County.

Blue-Green Algae Bloom Watch is in effect for Milford Reservoir (Zone B), Clay, Dickinson and Geary County.

October 23, 2015: Blue-Green Algae Bloom Warning is in effect for Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; Harvey County East Lake, Harvey County; Hiawatha City Lake, Brown County; Nemaha State Fishing Lake, Nemaha County; and Plainville Township Lake, Rooks.

Blue-Green Algae Bloom Watch is in effect for Milford Reservoir (zone C), Clay, Dickinson and Geary County.

October 15, 2015: Blue-Green Algae Bloom Warning is in effect Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; Harvey County East Lake, Harvey County; Hiawatha City Lake, Brown County; McPherson County State Fishing Lake, McPherson County; Melvern River Pond, Osage County; Milford Reservoir (Zone C), Clay, Dickinson and Geary County; Nemaha State Fishing Lake, Nemaha County; and Plainville Township Lake, Rooks County.

October 8, 2015: Blue-Green Algae Bloom Warning is in effect Brown County State Fishing Lake, Brown County; Chisolm Creek Park Lake, Sedgwick County; Harvey County East Lake, Harvey County; Hiawatha City Lake, Brown County; McPherson County State Fishing Lake, McPherson County; Melvern River Pond, Osage County;; Nemaha State Fishing Lake, Nemaha County; and Plainville Township Lake, Rooks County.

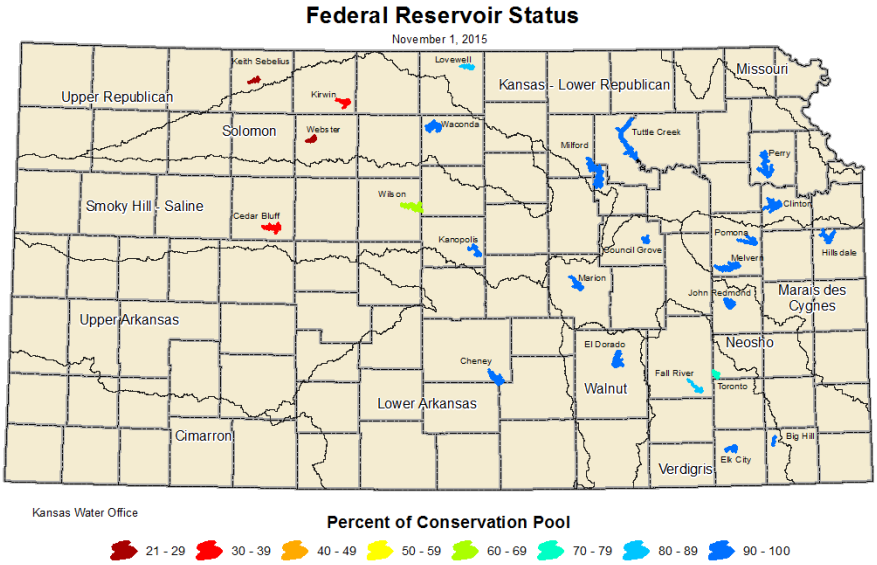
A map of the affected areas can be accessed at https://maps.kdhe.state.ks.us/habkscounty/ .

Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged.

Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect.

General Reservoir Conditions

The conservation pools at the water supply reservoirs in eastern Kansas are full. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool. Wilson Reservoir is also relatively low at only 66% of conservation pool.



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**11/01/2015 06:00 AM**		
Norton[1]	2304.3	2287.30*	-17.00*	26.2*
Harlan County, NE	1945.73	1931.15	-14.58	48.3
Lovewell[1]	1582.6	1580.12	-2.48	80.6
Milford[1]	1144.4	1145.27	0.87	100.0
Cedar Bluff	2144	2119.22*	-24.78*	32.2*
Kanopolis[1]	1463	1462.71	-0.29	98.2
Wilson[1]	1516	1505.88	-10.12	66.4
Webster[1]	1892.5	1869.97	-22.48	22.6
Kirwin[1]	1729.3	1712.70	-16.55	35.0
Waconda[1]	1455.6	1455.33	-0.27	98.5
Tuttle Creek[1]	1075	1074.87	-0.13	99.5
Perry[1]	891.5	892.10	0.60	100.0
Clinton[1]	875.5	876.84	1.34	100.0
Melvern[1]	1036	1035.16	-0.84	96.1
Pomona[1]	974	973.38	-0.62	95.6
Hillsdale[1]	917	917.48	0.48	100.0
Arkansas River Basin		**10/30/2015 08:00 AM**		
Cheney	1421.6	1420.65	-0.95	95.0
El Dorado	1339	1338.25	-0.75	97.0
Toronto[1]	901.5	900.01	-1.49	69.0
Fall River[1]	948.5	947.50	-1.00	86.0
Elk City[1]	796	795.53	-0.47	96.0
Big Hill	858	857.44	-0.56	98.0
Council Grove[1]	1274	1272.77	-1.23	93.0
Marion[1]	1350.5	1349.91	-0.59	96.0
John Redmond[1]	1039	1040.68	-0.32	96.0

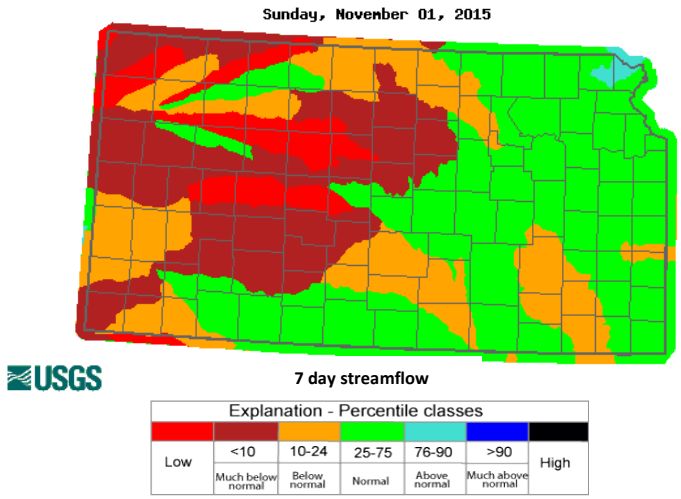
[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

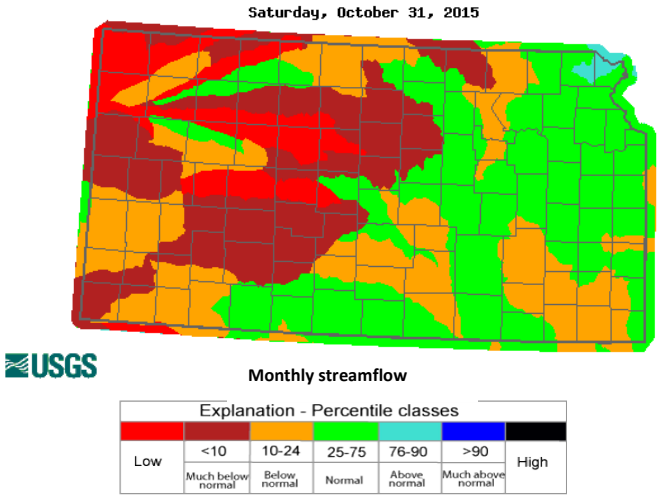
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.
* Data from 11/02/2015 6 am, unavailable 11/1/15

Streamflow Conditions

Kansas streamflows during July varied across the state, but remain below historical normal flows in parts of west and central Kansas.

The comparison of present **7-day** streamflow to historical is shown on the map below left and to the **October** streamflow compared to historical is shown on the map below, right. Short term streamflow is significantly lower than historical average in many area of western Kansas. The longer, nearly monthly average flow was slightly better compared to historical, with mores areas above normal flow due to storm events that produced abnormal local runoff in August in some of these areas.





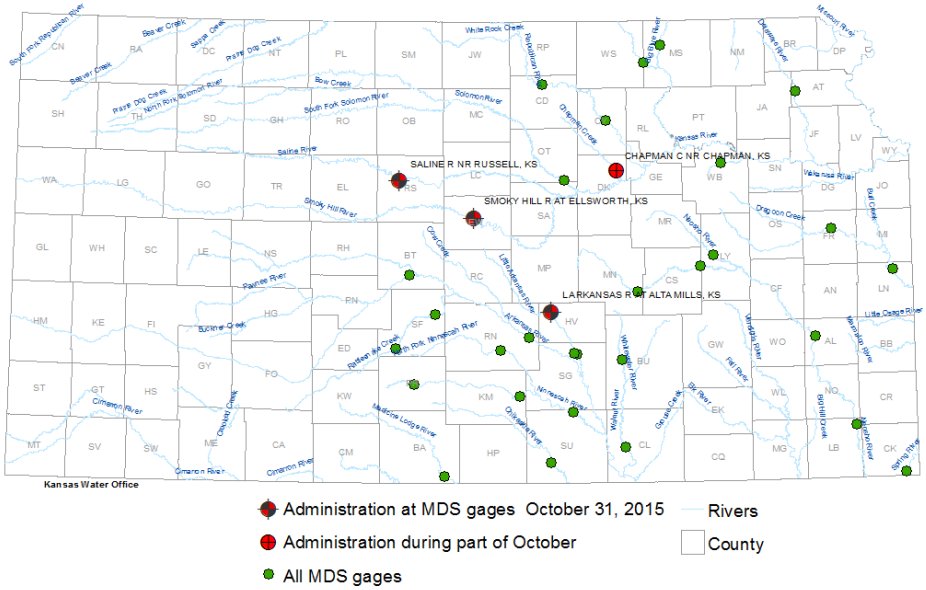
In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.

Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

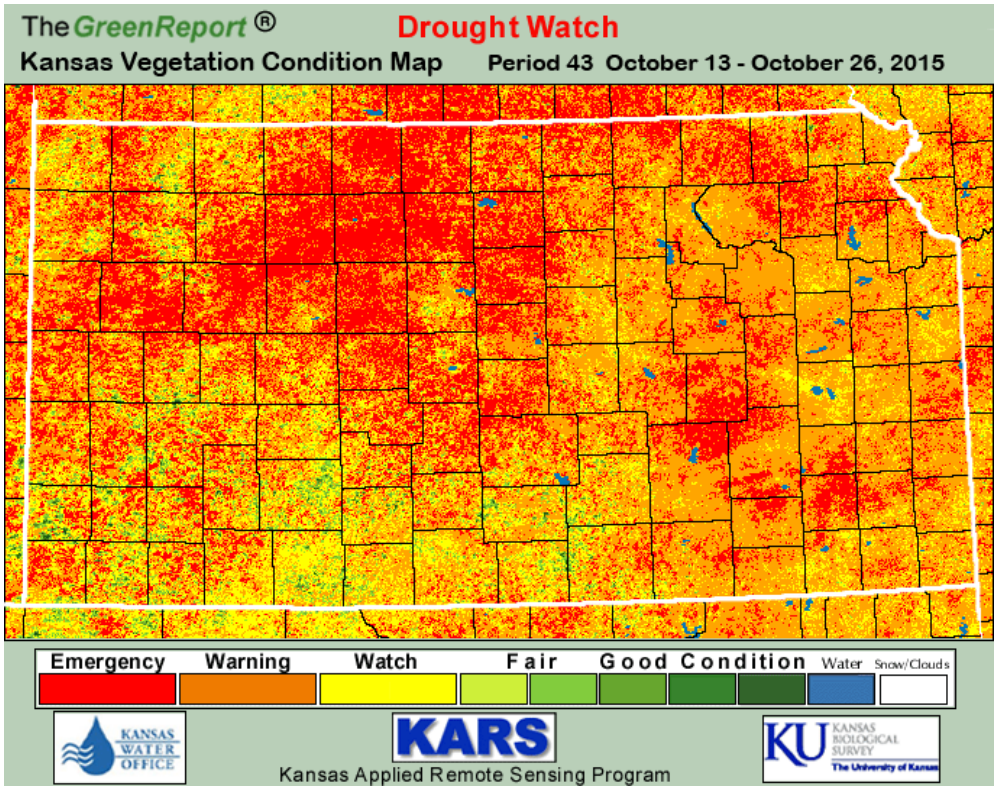
Streamflows in cubic feet per second (cfs)									
Gaging Station	**Flow Oct 1**	**Flow Oct 8**	**Flow Oct 15**	**Flow Oct 22**	**Flow Oct 29**	**Oct MDS**	**Nov MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	100	76	65	69	65	65	80	03/20/15; ceased 05/29/15	
Republican River at Clay Center	133	124	117	113	124	90	100	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	3	3	3	4	4	15	20	03/23/15	3
Saline River near Russell	1	-	-	1	0	5	5	9/5/15	10
Solomon River at Niles	-	-	-	-	34	40	40		
Chapman Creek near Chapman	9	11	11	16	11	10	10	9/28/15; ceased 10/22/15	
Little Arkansas River at Alta Mills	1	1	2	1	2	8	8	9/14/15	8
Neosho River near Parsons	141	134	57	43	43	50	50		

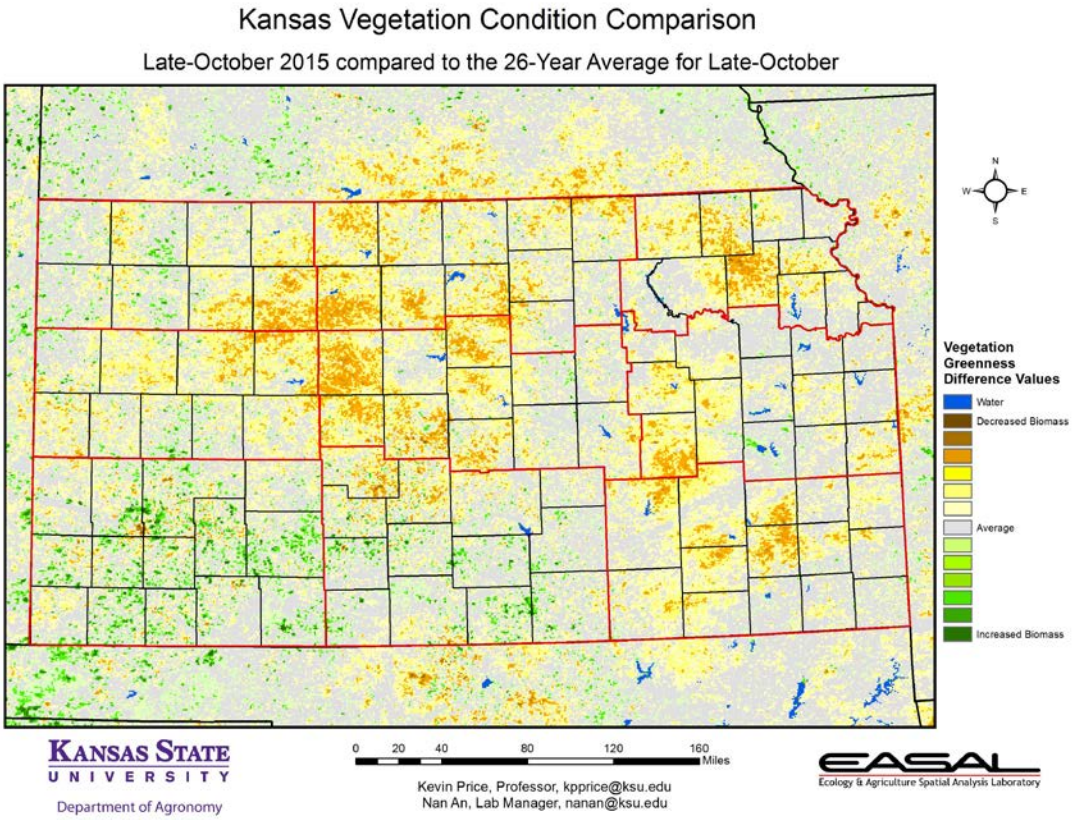
Kansas Minimum Desirable Streamflow (MDS) Gages Administration
October 29, 2015



Soil, Crop and Vegetation
Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. The GreenReport indicates that things are very dry throughout the state.



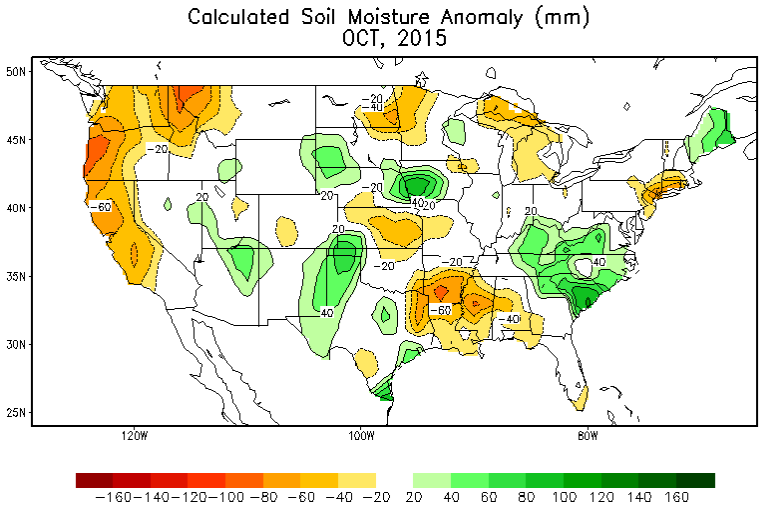


Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for Late-October from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that southwest Kansas continues at or above average photosynthetic activity

Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.



Crops, Feed and Livestock

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending November 1, 2015 reported topsoil moisture rated 11 percent very short, 33 short, 54 adequate, and 2 surplus. Subsoil moisture rated 12 percent very short, 35 short, 53 adequate, and 0 surplus.

Field Crops:
Winter wheat condition rated 2 percent very poor, 12 poor, 41 fair, 41 good, and 4 excellent..

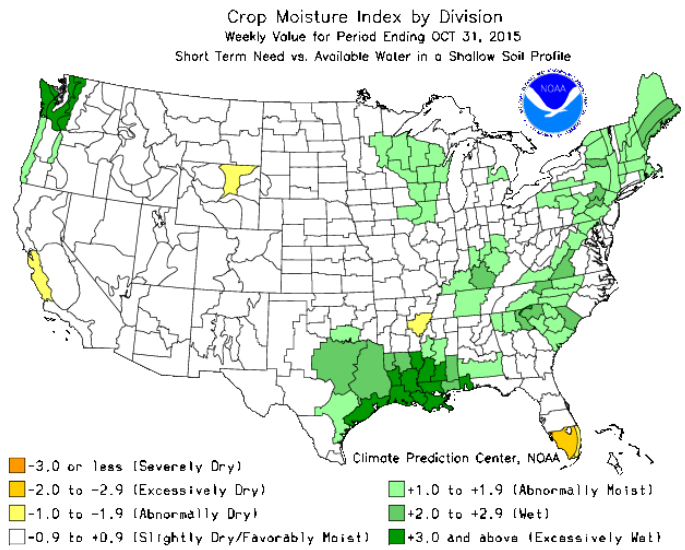
Sunflowers condition rated 1 very poor, 3 poor, 31 fair, 57 good, and 8 excellent.

Cotton condition rated 1 percent very poor, 11 poor, 27 fair, 50 good, and 11 excellent.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 5 very poor, 15 poor, 37 fair, 38 good, and 5 excellent. Stock water supplies rated 5 percent very short, 22 short, 72 adequate, and 1 surplus.

(http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.



Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance
USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

October 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	1.32	0.17	115%	56.0	5.1	92 (11)	26 (29)
Dodge City	3.22	1.48	185%	58.5	1.9	91 (11)	30 (29)
Garden City	3.48	2.20	272%	59.0	3.6	93 (11)	33 (31, 29)
Goodland	1.70	0.33	124%	56.4	4.5	93 (11)	25 (29)
Guymon, OK	5.18	3.61	330%	61.2	3.9	94 (11)	35 (31)
Hill City	2.09	0.57	138%	59.3	5.3	97 (11)	28 (29)
Lamar, CO	1.75	0.95	219%	58.3	5.4	96 (11)	31 (16)
McCook, NE	1.48	0.31	126%	57.7	6.4	95 (11)	24 (29)
Springfield, CO	0.74	-0.65	53%	57.3	3.4	92 (11)	33 (31,29)
Central							
Concordia	1.37	-0.55	71%	59.0	3.6	93 (11)	29 (29)
Hebron, NE	1.05	-1.16	48%	57.5	4.2	92 (11)	28 (30)
Medicine Lodge	1.06	-1.78	37%	61.7	3.1	92 (11)	31 (25)
Ponca City, OK	1.65	-1.73	49%	62.2	2.1	90 (11)	34 (26)
Salina	0.65	-1.62	29%	61.3	3.8	92 (11)	30 (29)
Wichita (ICT)	1.08	-1.70	39%	62.8	4.5	90 (11)	38 (29,25)
East							
Bartlesville, OK	1.45	-2.02	42%	60.0	0.5	90 (11)	31 (30)
Chanute	1.60	-2.06	44%	60.3	2.0	88 (8)	29 (30)
Fall City, NE	0.87	-1.77	33%	57.2	2.5	88 (11)	27 (30)
Johnson Co. Exec. Apt	1.47	-1.97	43%	57.9	0.9	84 (8)	31 (30)
Joplin, MO	0.70	-3.33	17%	60.0	0.7	86 (11)	33 (30)
Kansas City (MCI), MO	1.28	-1.88	41%	58.4	2.0	87 (8)	32 (29)
St. Joseph, MO	1.21	-1.60	43%	56.9	2.2	88 (8)	26 (30)
Topeka (TOP	0.90	-2.13	30%	58.7	2.1	87 (11,8)	29 (30)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – November 2015 Summary

Climate, Drought Conditions and Responses for Kansas

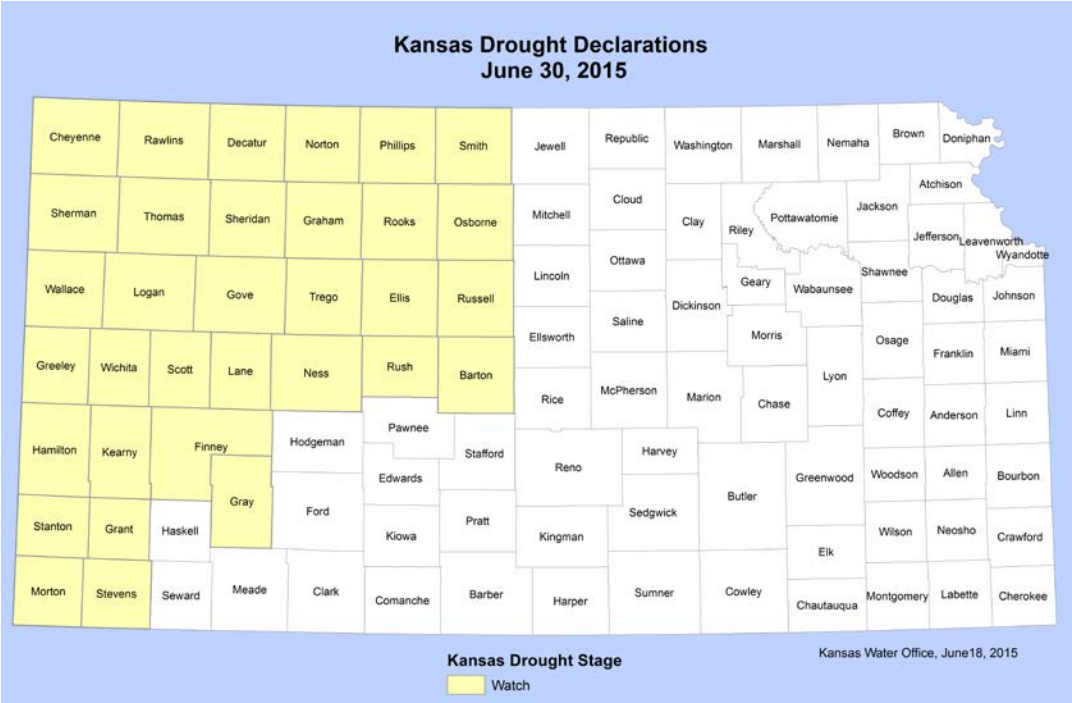
General

- June 29, 2015, Executive Order (EO) 15-04 issued by Governor for a drought watch for 33 counties.
- The US Drought Monitor indicated dry conditions continued through November in over 50% of Kansas.
- **December 2, 2015, USDA designated Barton County as a Primary Disaster Area due to excessive rain, high winds and hail that occurred September 10, 2015.**
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, due to drought. An additional 14 contiguous counties are also eligible federal for assistance.
- USDA declared three Kansas Counties Primary disaster areas due to tornados, excessive rain, flooding or high winds. An additional 18 contiguous counties are also eligible for federal assistance.
- Disaster declaration by the President issued for severe storms, tornados, straight line winds and flooding May 4-June 21, 2015. This makes disaster aid available through Federal Emergency Management Agency (FEMA).

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration was in effect on the Saline, Smoky Hill, Solomon, Republican and Little Arkansas rivers and Chapman Creek throughout November.
- Administration began November 18, on the Republican and Solomon Rivers.
- Administration on the Solomon River ceased on December 3, 2015.
- Blue-Green Algae Bloom Warning is in effect for Hiawatha City Lake, Brown County; and Plainville Township Lake, Rooks County (November 17, 2015).

Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.

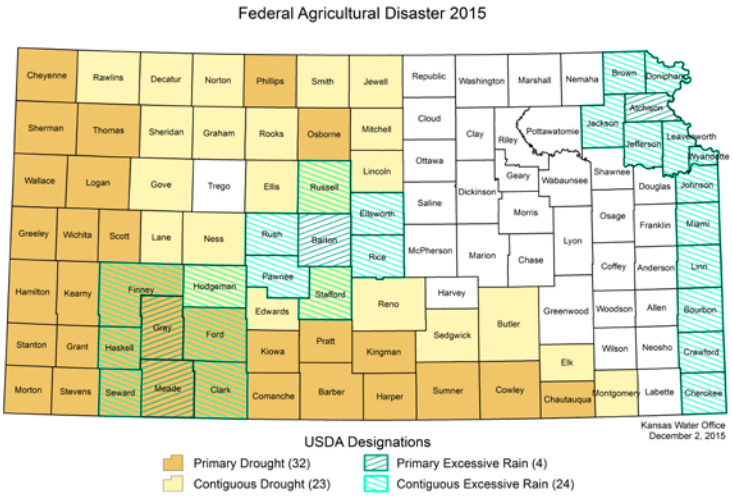


Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal Drought: USDA has designated 32 Kansas counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Osborne, Phillips, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 23 contiguous counties are also eligible for natural disaster assistance. These are Butler, Decatur, Edwards, Ellis, Elk, Gove, Graham, Hodgeman, Jewell, Lane, Lincoln, Mitchell, Ness, Norton, Rawlins, Reno, Rooks, Russell, Sheridan, Smith, Stafford, Sumner and Montgomery.

Federal Other: USDA designated three Kansas counties as Primary Disaster Areas for 2015 due to tornados, high winds, excessive rain or flooding on August 26. These are Atchison, Gray and Meade. In addition 18 Kansas counties, contiguous to primary disaster counties are also eligible for natural disaster assistance. These are Bourbon, Brown, Cherokee, Clark, Crawford, Doniphan, Finney, Ford, Haskell, Hodgeman, Jackson, Jefferson, Johnson, Leavenworth, Linn, Miami, Seward and Wyandotte.



December 2, 2015, USDA designated Barton County as a Primary Disaster Area due to excessive rain, high winds and hail that occurred September 10, 2015. Contiguous counties Ellsworth, Pawnee, Rice, Rush Stafford and Russell are also eligible for assistance.

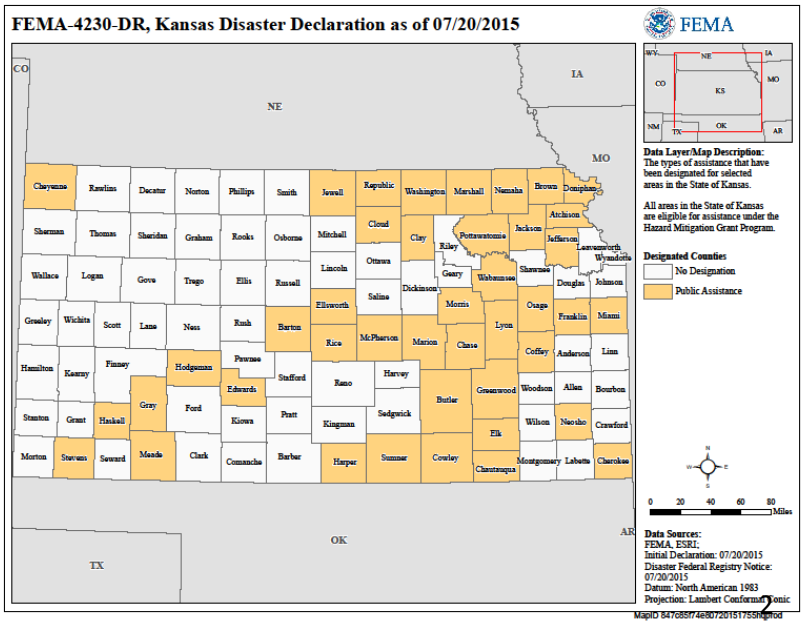
Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at:
http://www.fema.gov/news/disasters.fema.

July 20, 2015 the President declared disaster for Kansas areas affected by severe storms, tornadoes, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The President's action makes federal funding available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency



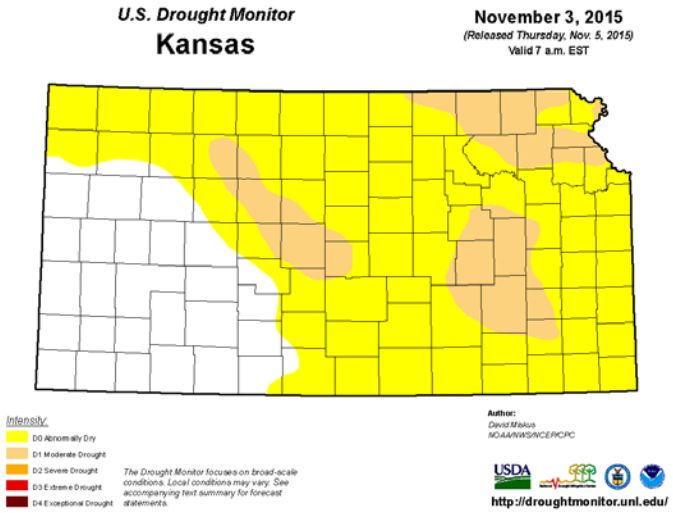
work and the repair or replacement of facilities damaged by the severe storms, tornadoes, and flooding in the counties of Atchison, Barton, Brown, Butler, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Cowley, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Harper, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Marion, Marshall, McPherson, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Rice, Stevens, Sumner, Wabaunsee, and Washington.

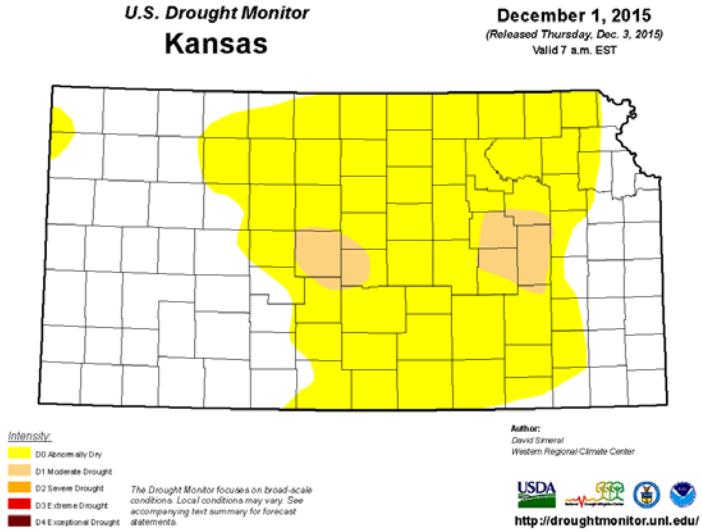
Federal funding is available on a cost-sharing basis for hazard mitigation measures statewide. More information may be found at http://www.fema.gov/news-release/2015/07/20/federal-aid-programs-state-kansas-declaration.

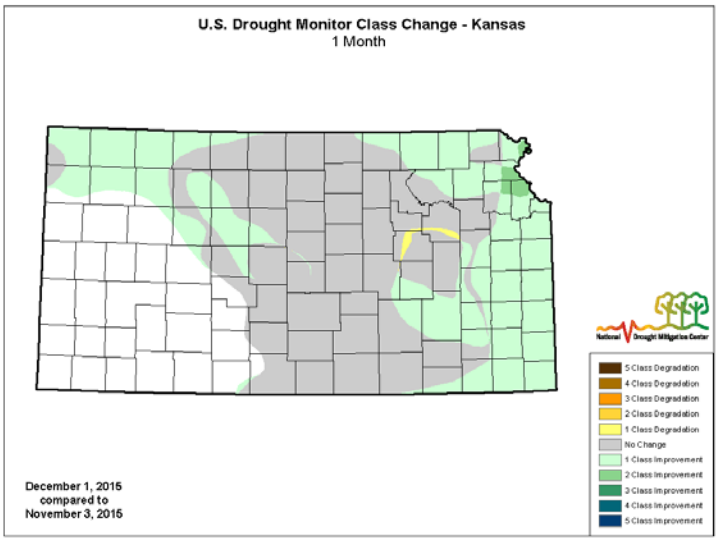
General Conditions

Above normal November precipitation contributed to drought conditions improvement. Over the month, areas of moderate drought conditions were reduced as was the area of abnormal dry conditions. The moderate drought remains in parts of central Kansas, as well as parts of the Flint Hills. Some long-term hydrological deficits are in place affecting some water supplies and reservoirs. The drought outlook is for improving conditions, and the precipitation outlook for December is positive. However, we are in a drier period of the year, so even above normal precipitation will be slow to erase the dry conditions. The current El Niño favors a southern storm track and associated jetstream, which is the main impetus behind the predicted removal of existing drought conditions across the central and southern Plains.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.

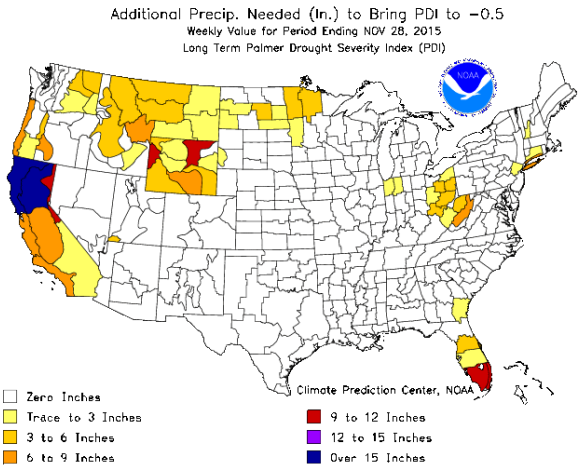






Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought. Note all Kansas climate divisions have caught up in moisture the week ending November 28, 2015.



Climate Division	Precipitation needed to End Drought (inches)			
	Week ending November 7	Week ending November 14	Week ending November 21	Week ending November 28
Northwest	3.31	2.89	-	-
West Central	-	-	-	-
Southwest	-	-	-	-
North Central	1.94	2.03	-	-
Central	2.59	2.72	0.56	-
South Central	-	-	-	-
Northeast	2.92	3.10	-	-
East Central	2.78	3.05	0.65	-
Southeast	1.96	2.34	-	-

Climate Summary (Temperature and Precipitation)

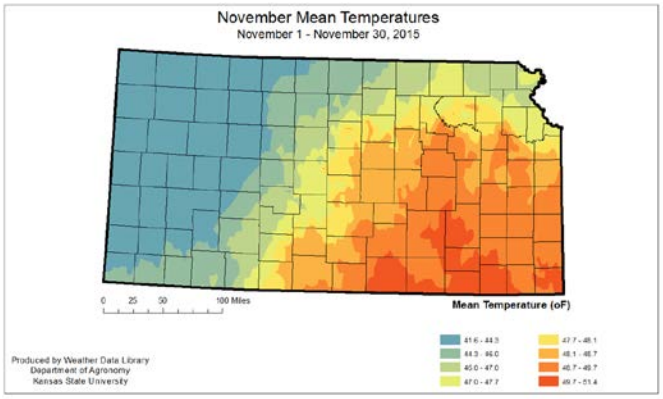
While warmer and wetter than average, conditions saw some very abrupt changes. The average state-wide temperature was 45.9 °F, which was the 17th warmest November on record. The warmest reading for the month was 84 °F, reported at Richfield 1SW in Stanton County on the 4th. Much of the state averaged 4 to 8 °F warmer than normal, while only the western third of the state was at or slightly warmer than normal. Twenty-one new daily record high maximum temperatures were set, although none of those were records for the month. There were also 65 new record warm minimum temperatures recorded during the month. The 60 °F reported at the Hutchinson airport on the 4th of November set a new record warm minimum for November at that location. Despite being warmer than average, cold temperatures were still noted.

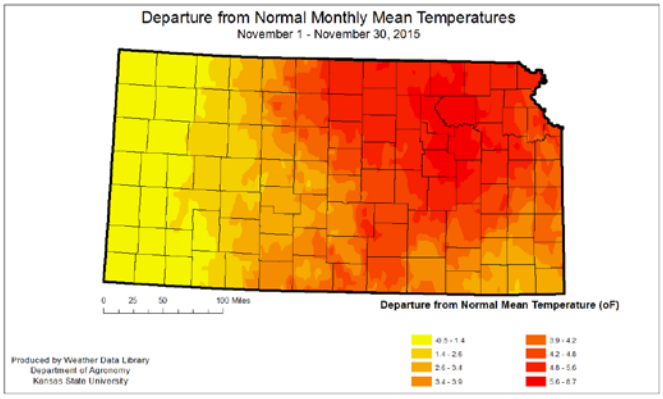
Eight new daily record low maximum temperatures were also recorded. Colby, in Thomas County, serves as an illustration of the temperature swings seen during the month. On the 16th, the high was 71 °F, with a low of 33 °F. On the 17th, the high was only 34 °F, while the low dropped to 20 °F.

The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

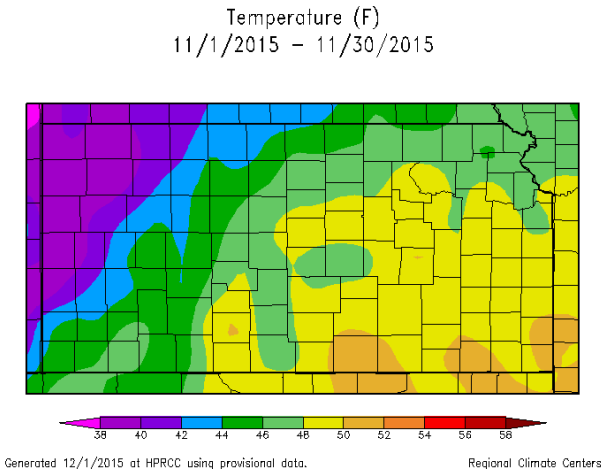
Climate Division	Kansas Climate Division Temperature Summary (°F)							
	November 2015							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	53.1	27.1	40.1	1.1	83	4	12	20
West Central	54.6	28.0	41.3	0.8	81	4	11	22
Southwest	58.8	31.2	45.0	2.1	84	4	16	22
North Central	58.1	34.3	46.2	5.0	81	3	17	22
Central	59.3	35.4	47.4	4.5	81	4	20	22
South Central	60.8	36.0	48.4	3.8	80	3	15	22
Northeast	59.5	34.1	46.8	4.6	82	3	13	28
East Central	60.2	37.0	48.6	5.0	80	2	21	22
Southeast	60.6	37.8	49.2	3.4	81	12	20	22
STATE	58.3	33.4	45.9	3.4	84	4th	11	22nd
Data Source: KSU Weather Library								

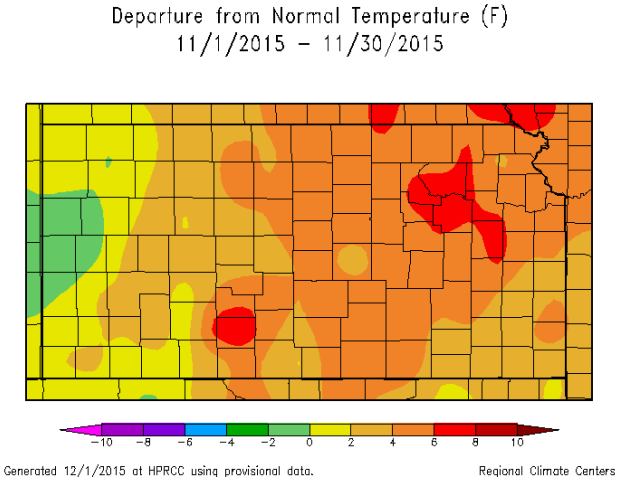
Temperature summary by the Kansas State University Weather Library for the month is provided in the maps below.





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.



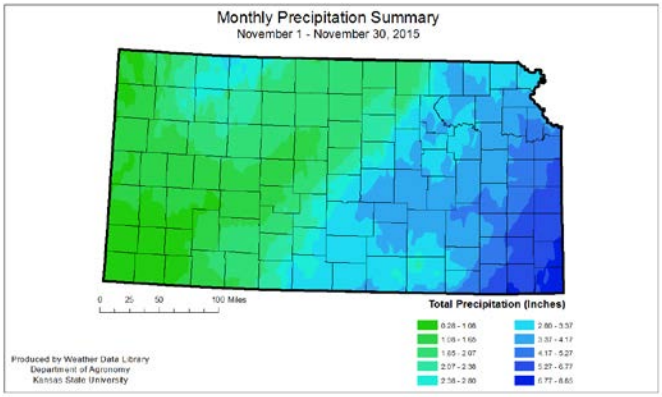


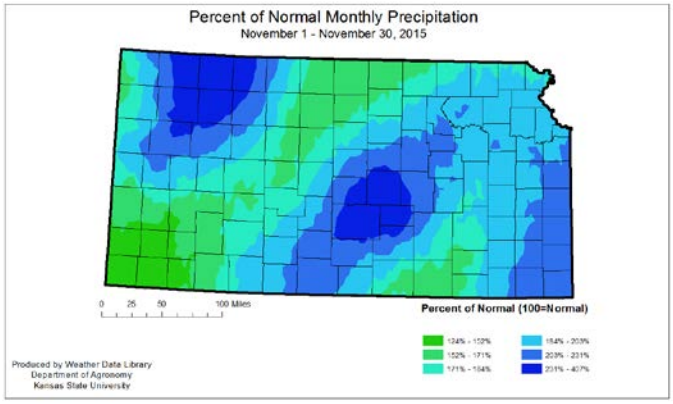
Moisture was plentiful state-wide, averaging 2.87 inches, or 201 percent of normal for the month. This makes it the 5th wettest November on record. There were major precipitation events during the month. The first event occurred between November 16th and November 18th. This brought a severe weather outbreak that included a preliminary total of 23 tornadoes. After the frontal system passed, rapidly falling temperatures resulted in heavy snow in the West Central and Northwestern divisions. The second was at the end of the month, starting on the 26th and persisting through the 30th. Temperatures during this event fluctuated near freezing, resulting in heavy ice accumulation in the South Central Division with lighter amounts in other parts of the state. Some minor snow accumulations were also seen. Atwood, in Rawlins County, reported the highest daily snow accumulation with 24 inches on the 19th, of which 7 inches was still on the ground at the end of the month. The highest monthly precipitation totals were 8.85 inches at Coffeyville, Montgomery County (NWS) and 8.00 inches at Pittsburg 0.7 WSW, Crawford County (CoCoRaHS). The greatest daily precipitation totals were 3.85 inches at Atwood, Rawlins County on the 19th (NWS) and 3.31 inches at Pittsburg 0.7 WSW, Crawford County on the 27th (CoCoRaHS).

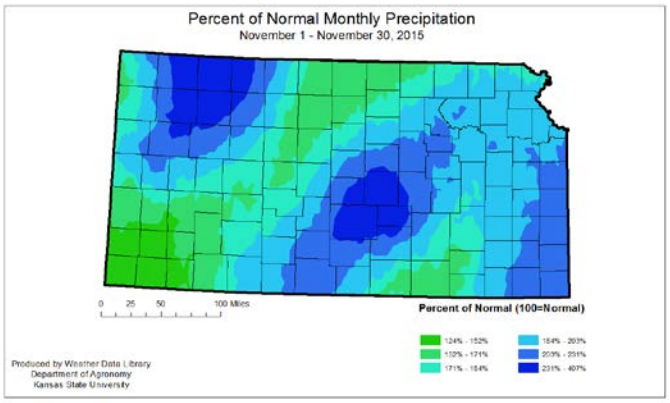
Kansas Climate Division Precipitation Summary (inches) - Summary November 2015												
	November 1-30, 2015			January 1– November 30, 2015			April 1– November 30, 2015			September 1–November 30, 2015		
Climate Division	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	2.26	1.44	269	20.33	-0.46	97	19.76	1.27	106	4.88	0.98	124
West Central	1.57	0.78	204	20.81	0.67	103	19.93	2.29	113	4.47	0.63	115
Southwest	1.20	0.54	177	26.99	7.76	139	25.18	8.33	148	6.01	2.22	155
North Central	2.01	0.78	160	24.74	-2.39	90	23.42	-0.24	97	4.25	-1.59	73
Central	2.72	1.48	213	25.92	-2.44	90	24.42	0.01	98	5.26	-0.63	88

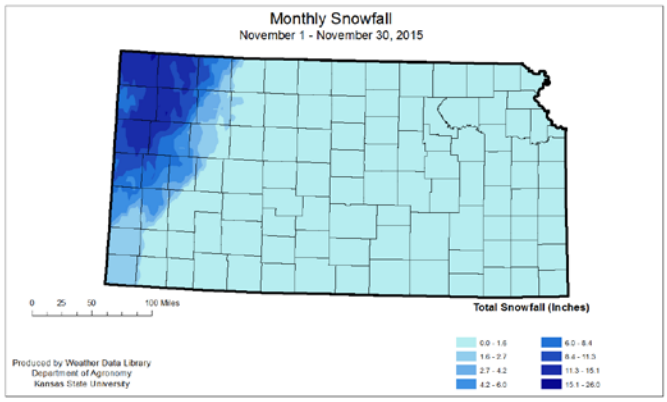
Kansas Climate Division Precipitation Summary (inches) - Summary November 2015												
	November 1-30, 2015			January 1– November 30, 2015			April 1– November 30, 2015			September 1–November 30, 2015		
Climate Division	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
South Central	3.33	1.84	219	32.09	1.89	106	30.45	4.87	118	6.66	-0.07	98
Northeast	3.56	1.79	201	35.30	1.52	104	33.09	3.52	111	7.14	-0.97	87
East Central	4.11	1.94	189	34.47	-2.05	93	32.32	0.72	101	7.7	-1.21	84
Southeast	5.19	2.60	197	37.15	-2.53	93	35.11	1.43	103	8.3	-1.97	79
STATE	2.87	1.45	201	28.80	0.45	102	27.22	2.72	111	6.12	-0.23	96

Precipitation summary for the month is provided in the maps below from the Kansas State University Weather Library.

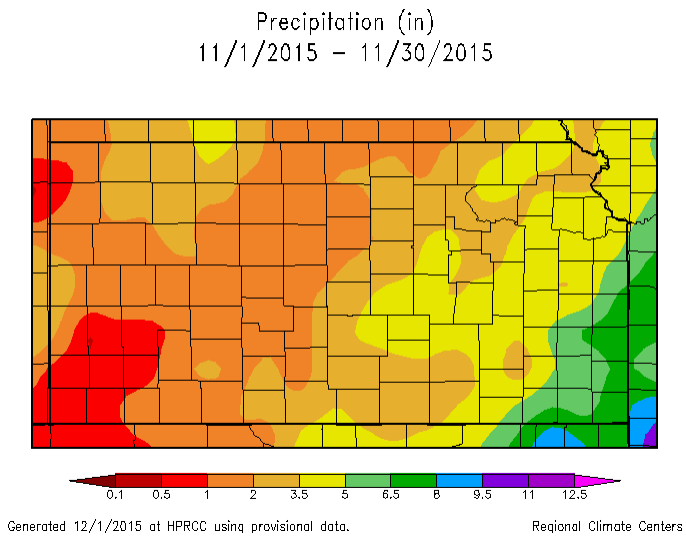


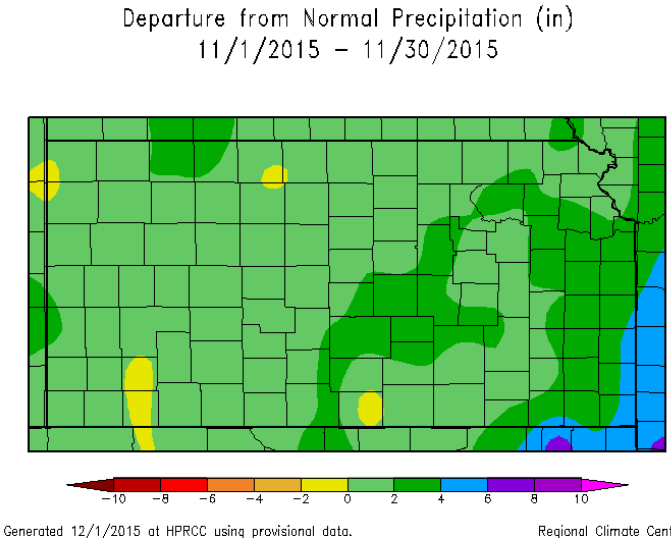






Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center.



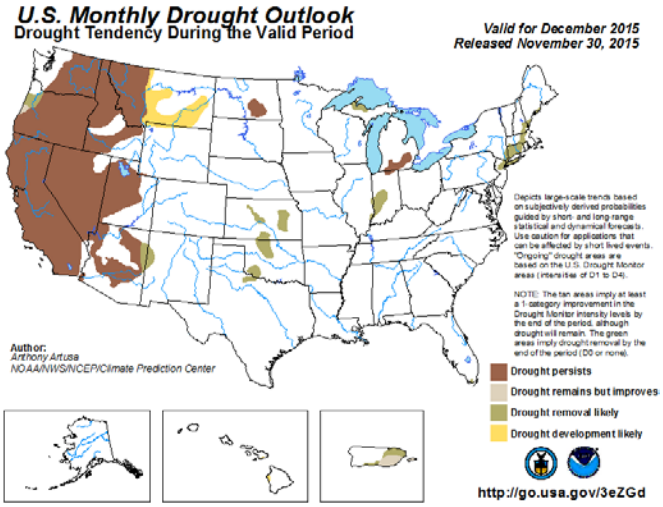


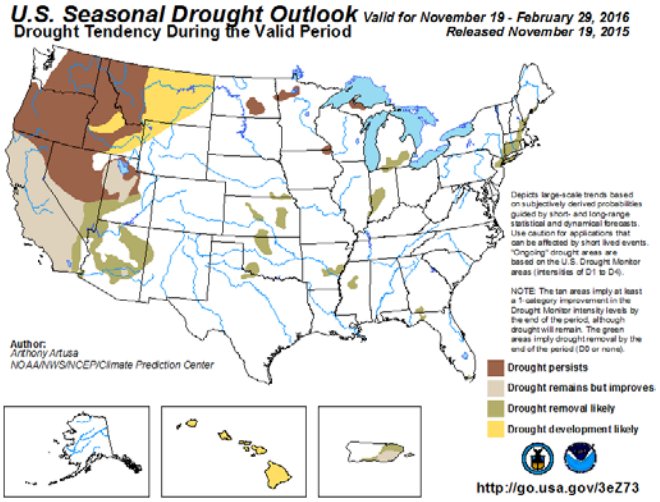
As noted earlier, severe weather included a tornado outbreak on the 16th. This was followed by blizzard conditions on the 18th and 19th. The month ended with a significant icing event from the 27th through the 29th. As of December 1st, Westar reported over 300 continuing outages, affecting more than 1,000 customers in the Hutchinson area.

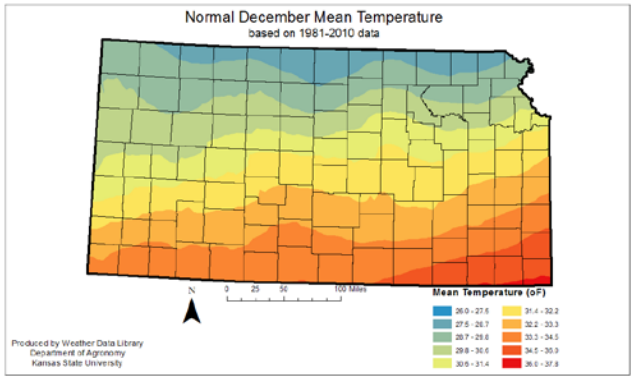
Future Outlook

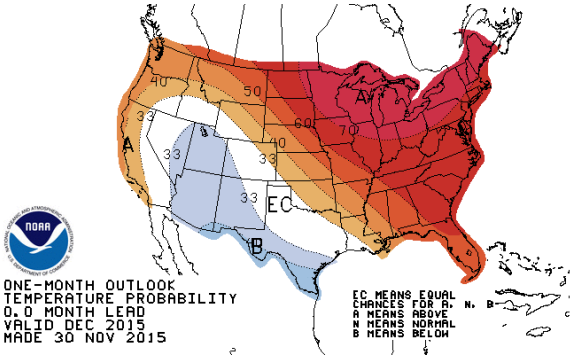
The drought outlook is for improving conditions, and the precipitation outlook for December is positive. However, we are in a drier period of the year, so even above normal precipitation will be slow to erase the dry conditions.

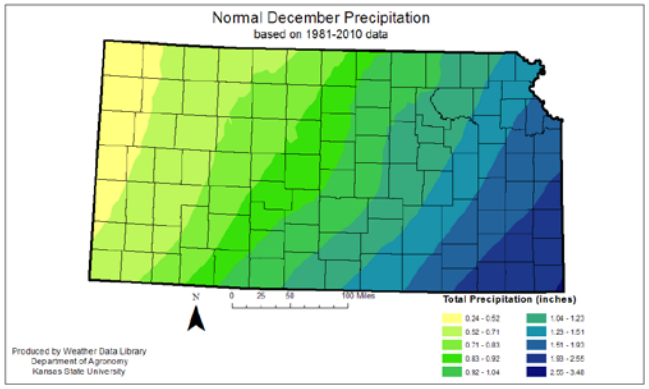
The Drought Outlook for the month of December and the Season Outlook for Mid- November through the end of February 2016 are provided below.

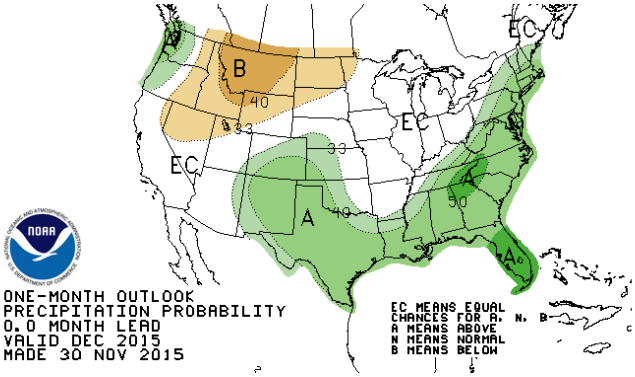




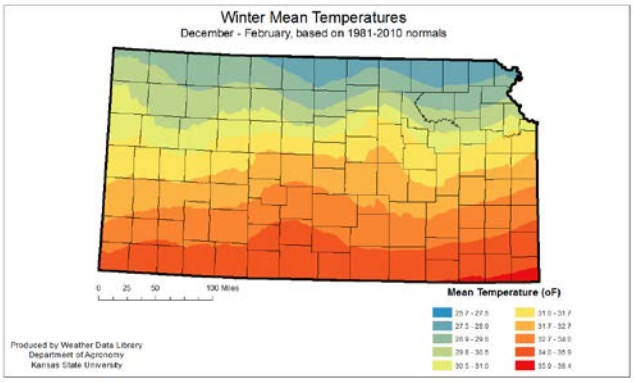


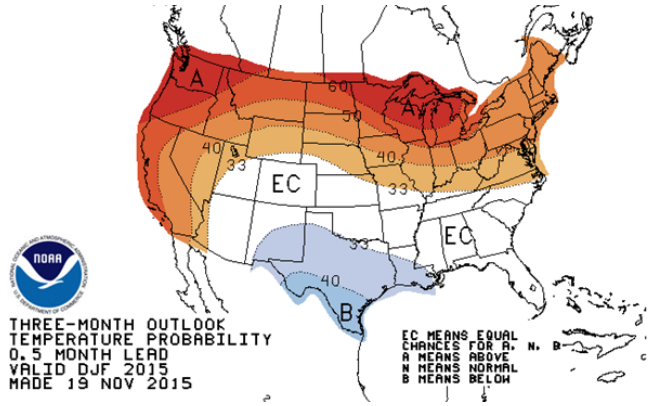


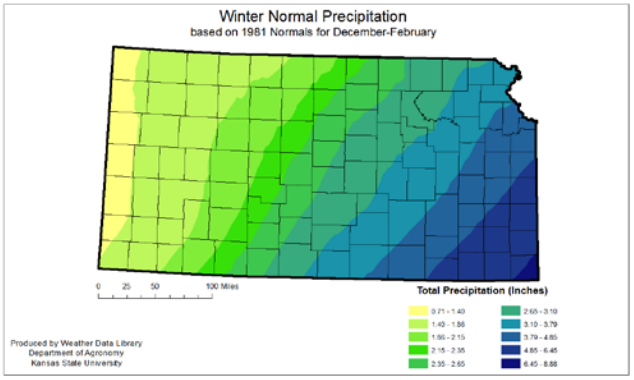


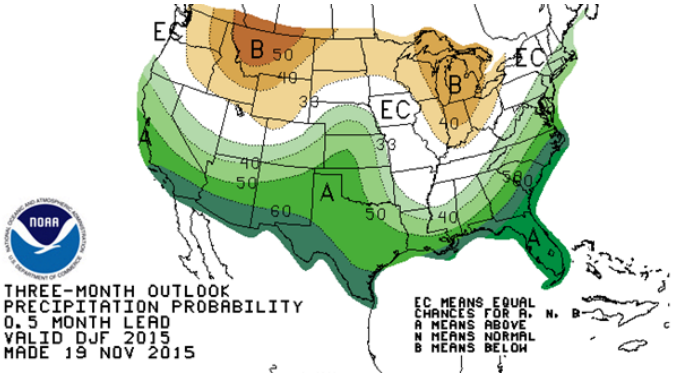


The early winter (three-month) outlook favors normal temperatures and above normal precipitation for December 2015 through February 2016.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Known issues:

Stage II water restrictions are in place for **Russell,** Russell County water customers. The water restrictions include a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Stage III water restrictions have been in place for **Victoria**, Ellis County since January 2014. No outdoor watering is allowed.

The City of **Natoma** in Osborne County reported to KDHE declining well water levels causing inability to pump two of three wells. A water watch (conservation plan) has been enacted.

Surface Water Supply Conditions

Kansas River basin: Reservoir inflow and streamflow throughout the system were low for the majority of November. Late month rain provided a significant amount of runoff and raised flow values above median levels. Milford, Tuttle Creek, Perry, and Clinton reservoirs all ended the month with rising pool elevations above normal multipurpose level.

Marais des Cygnes basin: Releases from Pomona and Melvern reservoirs were necessary to maintain streamflow for most of the month and both reservoirs declined until the late November rains. Inflow improved enough to fill Pomona and gain some storage at Melvern. Hillsdale Reservoir remained relatively static until the late month rains and then rose further into the flood pool. End of the month flows in the Marais des Cygnes River recovered to well-above median flow levels and active water right administration has ended.

Cottonwood / Neosho basin: Council Grove, Marion, and John Redmond reservoirs all experienced an end of the month recovery. John Redmond and Marion rose above normal pool while Council Grove only gained slightly. As with other Eastern Kansas basins, there were low flows over most of the month and then flows above historic median values in the last few days of November. The most significant increases in flow were downstream of John Redmond.

Verdigris basin: Fall River, Toronto, and Elk City reservoirs experienced declining elevations and releases were necessary to support target flows of Fall River and the Verdigris River for most of November. As in the Neosho basin, the lower system received more rain. Fall River and Toronto reservoirs increased in storage but Elk City ended the month in flood pool.

Saline basin: Wilson Lake level continued to decline, continuing to set new record low levels more than ten feet below the top of the multipurpose pool elevation. The Saline River remains well below median streamflow values.

Smoky Hill basin: The Smoky Hill basin was relatively dry throughout the month of November. Kanopolis inflows remained very low but releases were minimal and no significant decline was experienced. Downstream flow remained well below the historical median at the USGS gage at Mentor but exceeded the low flow target. Cedar Bluff Reservoir received very little inflow but did not decline.

Harmful Blue-Green Algal Blooms (lake water safety)

KDHE has issued two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. These notification levels are determined by the concentration of a harmful toxin(s) or the concentration of cyanobacteria cell counts.

Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged.

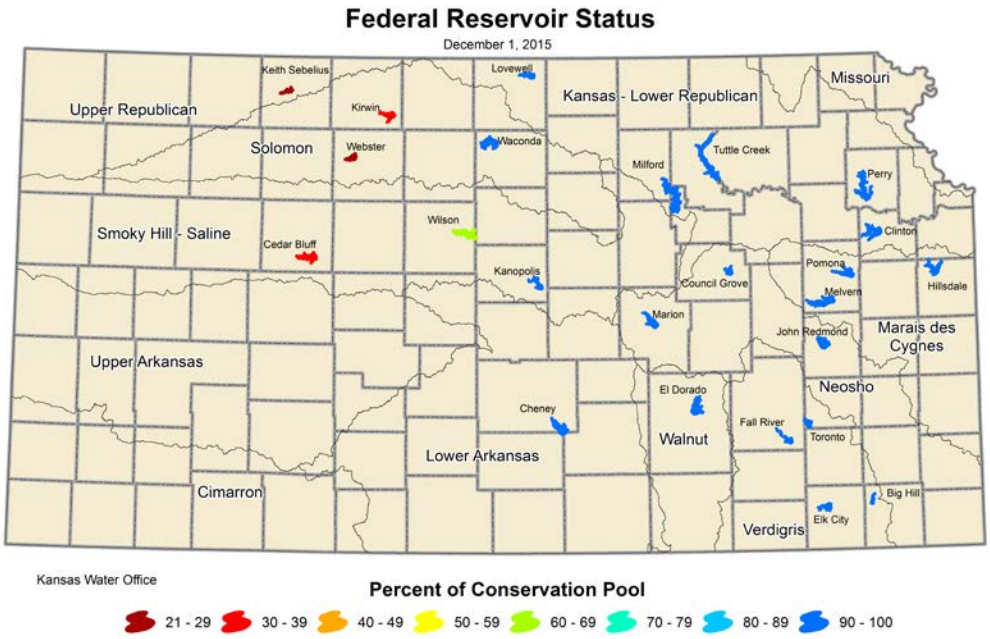
Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect.

November 17, 2015 the sampling season closed. Leaving two lakes on the warning list until the 2016 sampling season (April 1-Oct 31).

November 12, 2015: Blue-Green Algae Bloom Warning is in effect for Hiawatha City Lake, Brown County; and Plainville Township Lake, Rooks County.

General Reservoir Conditions

The conservation pools at the water supply reservoirs in eastern Kansas are full. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool. Wilson Reservoir is also relatively low at only 66% of conservation pool.



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**12/01/2015 06:00 AM**		
Norton[1]	2304.3	2287.62	-16.68	27.0
Harlan County, NE	1945.73	1931.70	-14.03	49.9
Lovewell[1]	1582.6	1581.18	-1.42	88.5
Milford[1]	1144.4	1145.27	0.87	100.0
Cedar Bluff	2144	2119.20	-24.80	32.2
Kanopolis[1]	1463	1462.69	-0.31	98.1
Wilson[1]	1516	1505.75	-10.25	66.1
Webster[1]	1892.5	1869.91	-22.54	22.5
Kirwin[1]	1729.3	1712.75	-16.50	35.1
Waconda[1]	1455.6	1455.38	-0.22	98.7
Tuttle Creek[1]	1075	1075.82	0.82	100.0
Perry[1]	891.5	892.42	0.92	100.0
Clinton[1]	875.5	877.99	2.49	100.0
Melvern[1]	1036	1035.30	-0.70	96.8
Pomona[1]	974	974.27	0.27	100.0
Hillsdale[1]	917	920.03	3.03	100.0
Arkansas River Basin		**12/01/2015 08:00 AM**		
Cheney	1421.6	1420.68	-0.92	95.0
El Dorado	1339	1338.28	-0.72	97.0
Toronto[1]	901.5	901.04	-0.46	90.0
Fall River[1]	948.5	948.02	-0.48	93.0
Elk City[1]	796	797.00	1.00	100.0
Big Hill	858	858.88	0.88	100.0
Council Grove[1]	1274	1272.76	-1.24	93.0
Marion[1]	1350.5	1350.50	0.00	100.0
John Redmond[1]	1039	1041.98	0.98	100.0

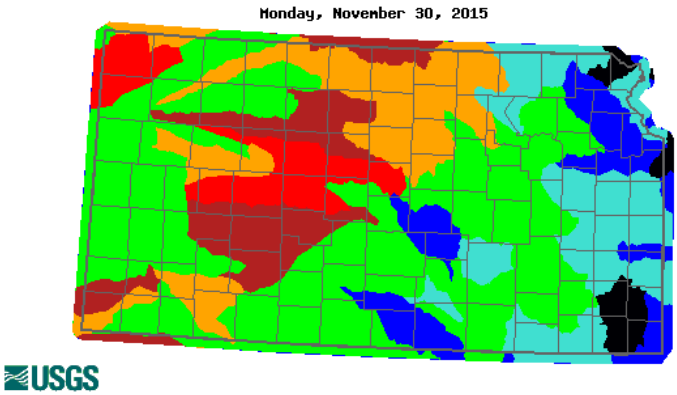
[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

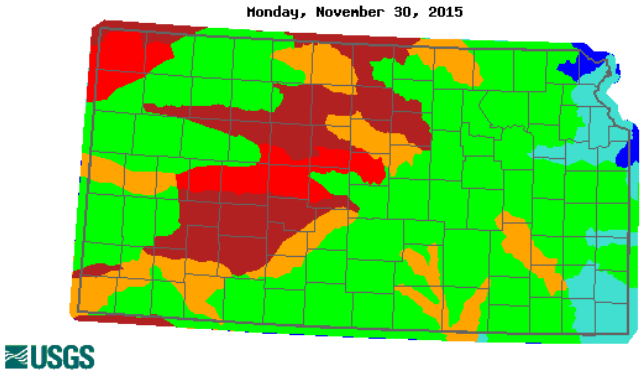
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.
* Data from 11/02/2015 6 am, unavailable 11/1/15

Streamflow Conditions

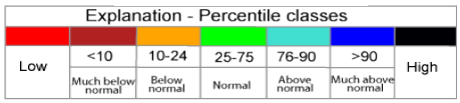
Kansas streamflows during July varied across the state, but remain below historical normal flows in parts of west and central Kansas.

The comparison of present **7-day** streamflow to historical is shown on the map below left and the **November** streamflow compared to historical is shown on the map below, right. Short term streamflow is significantly lower than historical average in many area of western Kansas.

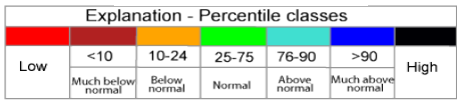




7-day streamflow



Monthly streamflow

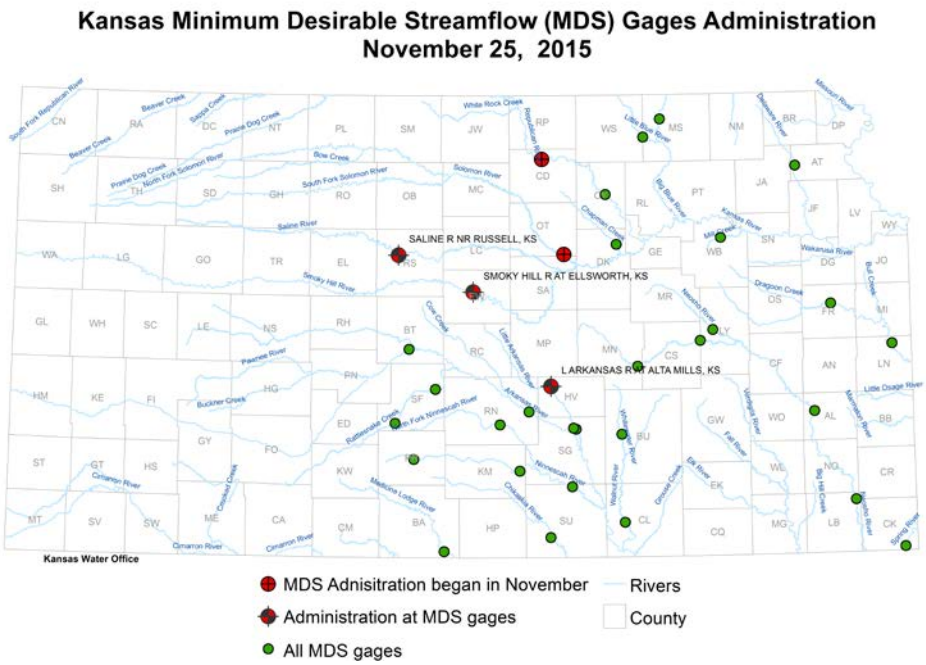


In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.

Water Right Administration/Minimum Desirable Streamflow (MDS)

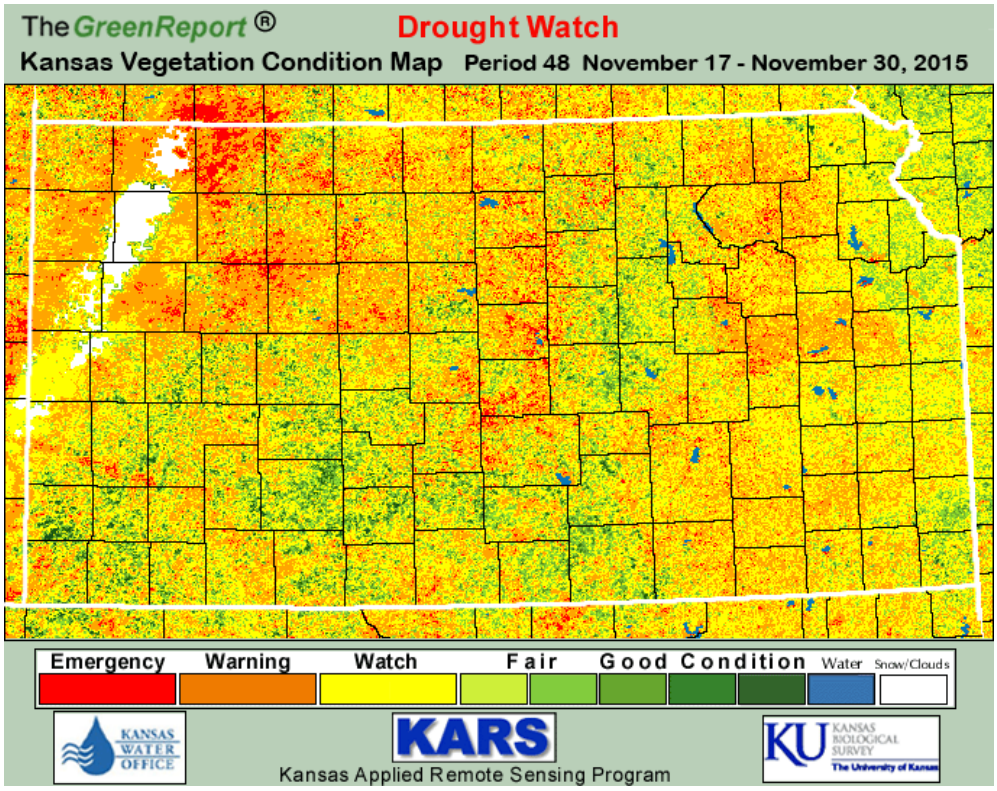
Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

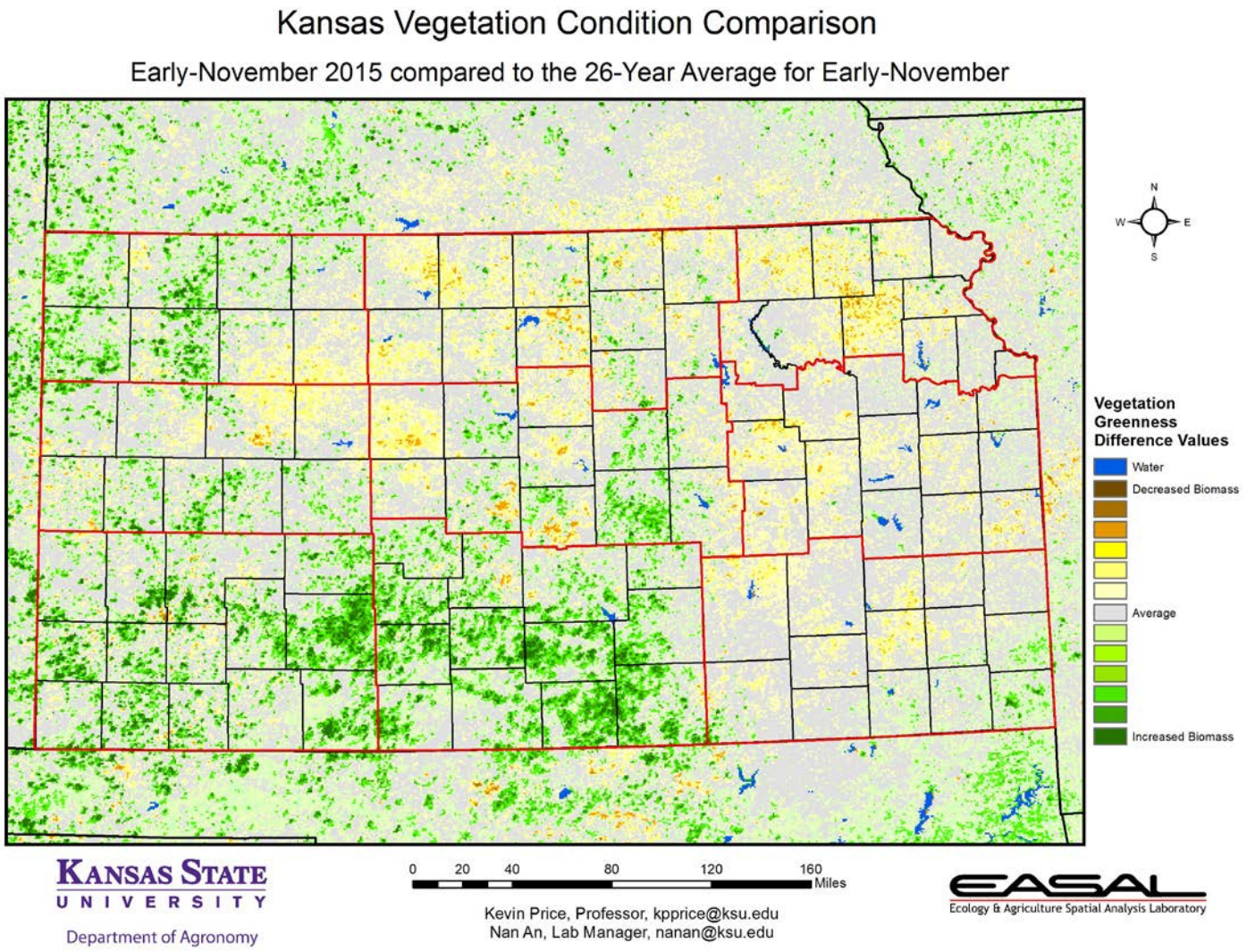
Streamflows in cubic feet per second (cfs)								
Gaging Station	**Flow Nov 5**	**Flow Nov 12**	**Flow Nov 17**	**Flow Nov 25**	**Nov MDS**	**Dec MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	**67**	**64**	**90**	**74**	**80**	**100**	**11/18/15**	70
Republican River at Clay Center	126	111	169	124	100	125	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	5	5	8	7	20	20	03/23/15	3
Saline River near Russell	1	UA	UA	1	5	5	9/5/15	10
Solomon River at Niles	**38**	**34**	**43**	**45**	**40**	**40**	**11/18/15**	37
Chapman Creek near Chapman	12	14	19	12	10	10	9/28/15; ceased 10/22/15	
Little Arkansas River at Alta Mills	2	2	6	5	8	8	9/14/15	8
Neosho River near Parsons	47	35	136	87	50	50		
							TOTAL	128



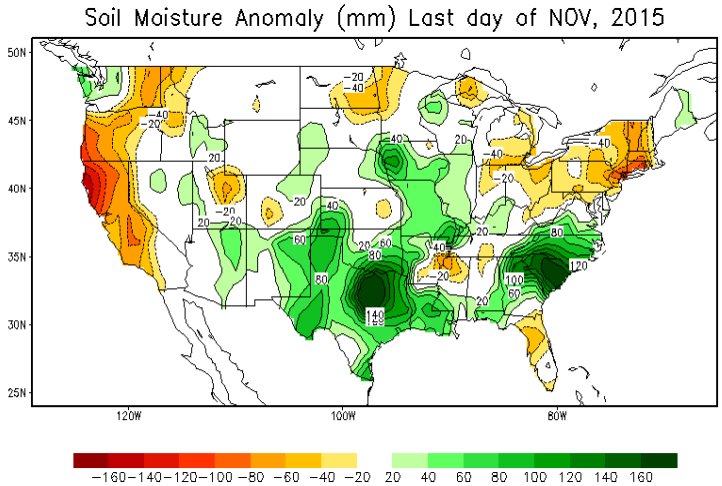
Soil, Crop and Vegetation
Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. The GreenReport indicates that the State is making a recovery from a dry October. Green colors indicate areas are winter wheat is beginning to grow.





Compared to the 26-year average at this time for Kansas, the K-State's Ecology and Agriculture Spatial Analysis Laboratory Vegetation Condition Report for early November indicated the end of the growing season saw much higher than average photosynthetic activity in the South Central Division. The western divisions also saw higher than average biomass production. In the eastern divisions, moisture was limited until the end of the month, and vegetation response is not visible. (The late November report was unavailable.)



Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml

Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at:
http://www.ksre.ksu.edu/p.aspx?tabid=255.

Crops, Feed and Livestock

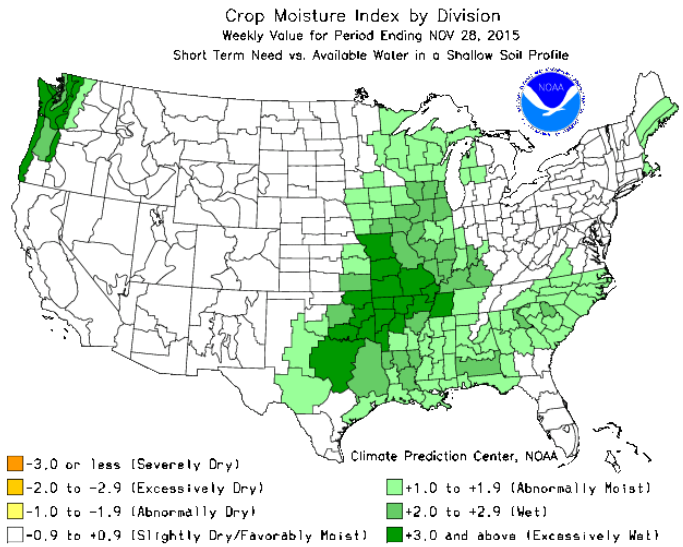
USDA Crop Progress and Condition provide some indication of the climatic effects on soil, feed supplies and crops. The report for the week ending November 30, 2015 reported topsoil moisture rated 6 percent very short, 17 short, 67 adequate, and 10 surplus. Subsoil moisture rated 9 percent very short, 25 short, 64 adequate, and 2 surplus.

Field Crops:
Winter wheat condition rated 2 percent very poor, 8 poor, 42 fair, 42 good, and 6 excellent.

Livestock, Pasture and Range Conditions: Pasture and range condition rated 5 very poor, 15 poor, 39 fair, 37 good, and 4 excellent. Stock water supplies rated 4 percent very short, 22 short, 72 adequate, and 4 surplus.

(http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.



Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;
- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance
USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland, not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

November 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	1.33	0.74	225%	39.8	1.6	80 (3)	15 (30)
Dodge City	1.97	1.21	259%	44.6	1.5	79 (3)	20 (27)
Garden City	0.67	0.12	122%	43.9	2.2	81 (3)	17 (22)
Goodland	0.89	0.18	125%	39.8	0.8	81 (3)	17 (27)
Guymon, OK	1.20	0.67	226%	46.2	0.6	84 (3)	22 (27)
Hill City	1.29	0.34	136%	44.0	3.3	81 (3,1)	21 (27)
Lamar, CO	0.52	0.14	137%	41.0	1.0	86 (3)	12 (30)
McCook, NE	2.79	1.84	294%	40.9	2.7	80 (4)	19 (27)
Springfield, CO	0.47	-0.11	81%	39.9	-1.8	80 (3)	12 (19)
Central							
Concordia	2.17	1.06	195%	47.0	5.4	79 (2)	22 (27)
Hebron, NE				44.7	5.3	78 (1)	21 (27)
Medicine Lodge	3.07	2.14	330%	47.9	2.5	78 (3)	22 (22)
Ponca City, OK	3.27	1.46	181%	51.0	3.2	79 (5)	24 (22,21)
Salina	2.18	0.93	174%	49.1	5.2	81 (1)	24 (22)
Wichita (ICT)	4.17	2.74	292%	50.0	4.6	79 (5)	24 (22,21)
East							
Bartlesville, OK	6.18	3.50	231%	49.3	1.3	79 (11)	20 (22)
Chanute	5.49	2.99	220%	49.3	3.0	77 (11)	21 (22)
Fall City, NE	4.03	2.07	206%	47.4	6.4	79 (2)	24 (27)
Johnson Co. Exec. Apt	5.82	3.33	234%	47.5	3.5	74 (11)	24 (22,21)
Joplin, MO	8.11	4.33	215%	50.5	2.0	78 (11)	23 (22)
Kansas City (MCI), MO	4.43	2.28	206%	48.2	4.6	76 (1)	23 (22)
St. Joseph, MO	4.10	2.55	265%	47.1	5.2	77 (2,1)	23 (21)
Topeka (TOP	5.11	3.26	276%	48.5	4.7	79 (1)	26 (23,21)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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

KANSAS CLIMATE and DROUGHT UPDATE – December 2015 Summary

Climate, Drought Conditions and Responses for Kansas

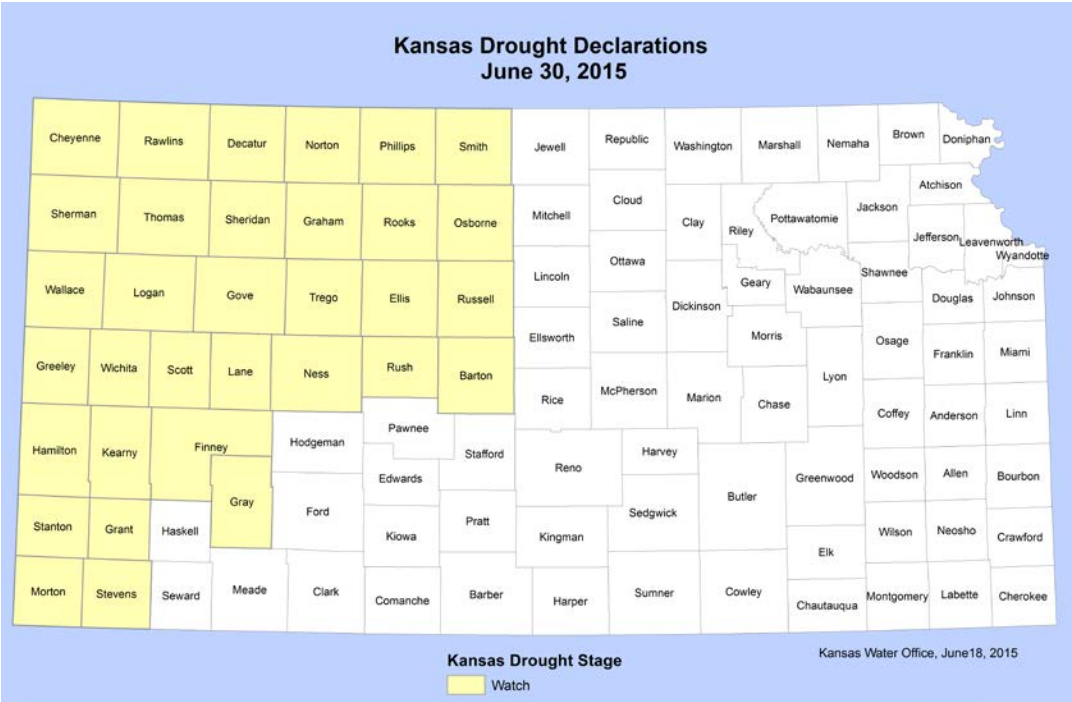
General

- In effect, June 29, 2015, Executive Order (EO) 15-04 issued by Governor for a drought watch for 33 counties.
- The US Drought Monitor indicated drought conditions were gone by the end of the December with 2% of Kansas abnormally dry (parts of Barton, Cheyenne, Pawnee and Sherman counties) on December 29th.
- December 2, 2015, USDA designated Barton County as a Primary Disaster Area due to excessive rain, high winds and hail that occurred September 10, 2015, making a total of four counties primary and 24 contiguous counties for federal agricultural program assistance for the 2015 crop year.
- USDA declared 30 Kansas Counties Primary Disaster areas for 2015, due to drought. An additional 14 contiguous counties are also eligible federal for assistance.
- Disaster declaration by the President issued for severe storms, tornados, straight line winds and flooding May 4-June 21, 2015. This makes disaster aid available through Federal Emergency Management Agency (FEMA).

Lakes and Streams

- Minimum Desirable Streamflow (MDS) Administration was in effect on the Saline, Smoky Hill, Solomon, Republican and Little Arkansas during December. It remains in effect on the Saline, Smoky Hill and Republican at the end of December.
- Administration on the Solomon River ceased on December 3, 2015.
- Administration ceased on the Little Arkansas at Alta Mills on December 15, 2015.
- Blue-Green Algae Bloom Warning is in effect for Hiawatha City Lake, Brown County; and Plainville Township Lake, Rooks County (November 17, 2015).

Kansas County Drought Declarations: Executive Order 15-04 was issued by Governor Brownback June 30, 2015, modifying drought declarations for Kansas counties. Drought watch is in effect for 33 counties as the overall conditions for plant growth and deficits in precipitation require careful consideration in planning for future water use.

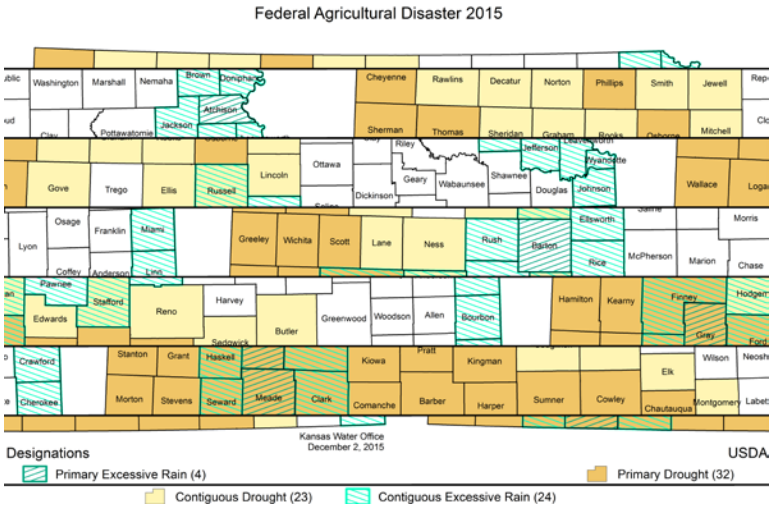


Drought Watch: Barton, Cheyenne, Decatur, Ellis, Finney, Gove, Graham, Grant, Gray, Greeley, Hamilton, Kearny, Lane, Logan, Morton, Ness, Norton, Osborne, Phillips, Rawlins, Rooks, Rush, Russell, Scott, Sheridan, Sherman, Smith, Stanton, Stevens, Thomas, Trego, Wallace, Wichita

Federal Drought: USDA has designated 32 Kansas counties as Primary Disaster Areas for 2015 due to drought. These are Barber, Chautauqua, Cheyenne, Clark, Comanche, Cowley, Finney, Ford, Grant, Gray, Greeley, Hamilton, Harper, Haskell, Kearny, Kingman, Kiowa, Logan, Meade, Morton, Osborne, Phillips, Pratt, Scott, Seward, Sherman, Stanton, Stevens, Sumner, Thomas, Wallace and Wichita.

In addition 23 contiguous counties are also eligible for natural disaster assistance. These are Butler, Decatur, Edwards, Ellis, Elk, Gove, Graham, Hodgeman, Jewell, Lane, Lincoln, Mitchell, Ness, Norton, Rawlins, Reno, Rooks, Russell, Sheridan, Smith, Stafford, Sumner and Montgomery.

Federal Other: USDA designated three Kansas counties as Primary Disaster Areas for 2015 due to tornados, high winds, excessive rain or flooding on August 26. These are Atchison, Gray and Meade. In addition 18 Kansas counties, contiguous to primary disaster counties are also eligible for natural disaster assistance. These are Bourbon, Brown, Cherokee, Clark, Crawford, Doniphan, Finney, Ford, Haskell, Hodgeman, Jackson, Jefferson, Johnson, Leavenworth, Linn, Miami, Seward and Wyandotte.



December 2, 2015, USDA designated Barton County as a Primary Disaster Area due to excessive rain, high winds and hail that occurred September 10, 2015. Contiguous counties Ellsworth, Pawnee, Rice, Rush Stafford and Russell are also eligible for assistance.

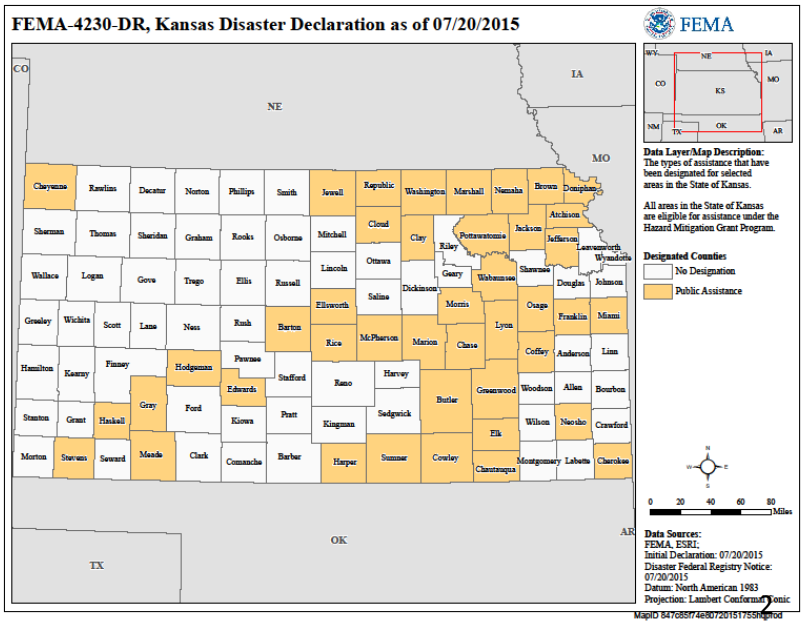
Qualified farm operators in the designated areas are eligible for low interest emergency (EM) loans from USDA's Farm Service Agency (FSA), provided eligibility requirements are met. Farmers in eligible counties have eight months from the date of the declaration to apply for loans to help cover part of their actual losses. FSA will consider each loan application on its own merits, taking into account the extent of losses, security available and repayment ability. FSA has a variety of programs, in addition to the EM loan program, to help eligible farmers recover from adversity.

Additional programs available to assist farmers and ranchers include the Emergency Conservation Program, the Livestock Forage Disaster Program, the Livestock Indemnity Program, Emergency Assistance for Livestock, Honeybees, Farm-Raised Fish Program, and the Tree Assistance Program. Interested farmers may contact their local USDA Service Centers for further information on eligibility requirements and application procedures for these and other programs.

Drought assistance information from USDA may be found at:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Up-to-date information regarding declared disaster counties and assistance available due to presidential declarations is available at:
http://www.fema.gov/news/disasters.fema.

July 20, 2015 the President declared disaster for Kansas areas affected by severe storms, tornadoes, straight-line winds, and flooding during the period of May 4 to June 21, 2015. The President's action makes federal funding available to state and eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency



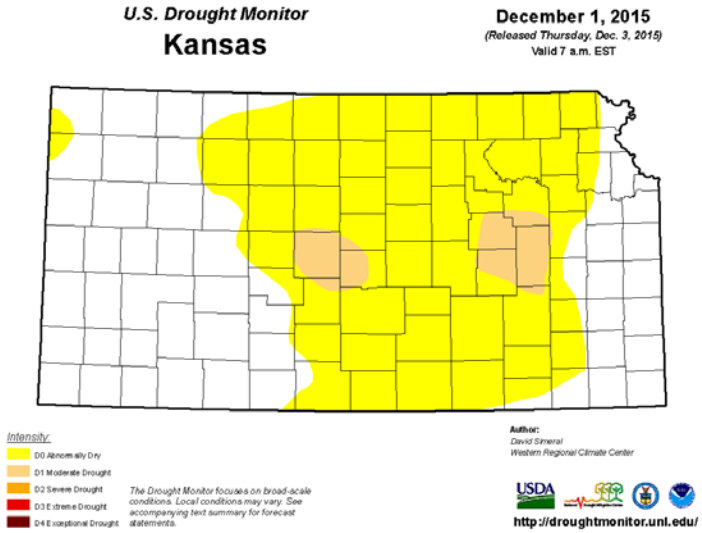
work and the repair or replacement of facilities damaged by the severe storms, tornadoes, and flooding in the counties of Atchison, Barton, Brown, Butler, Chase, Chautauqua, Cherokee, Cheyenne, Clay, Cloud, Coffey, Cowley, Doniphan, Edwards, Elk, Ellsworth, Franklin, Gray, Greenwood, Harper, Haskell, Hodgeman, Jackson, Jefferson, Jewell, Lyon, Marion, Marshall, McPherson, Meade, Miami, Morris, Nemaha, Neosho, Osage, Pottawatomie, Republic, Rice, Stevens, Sumner, Wabaunsee, and Washington.

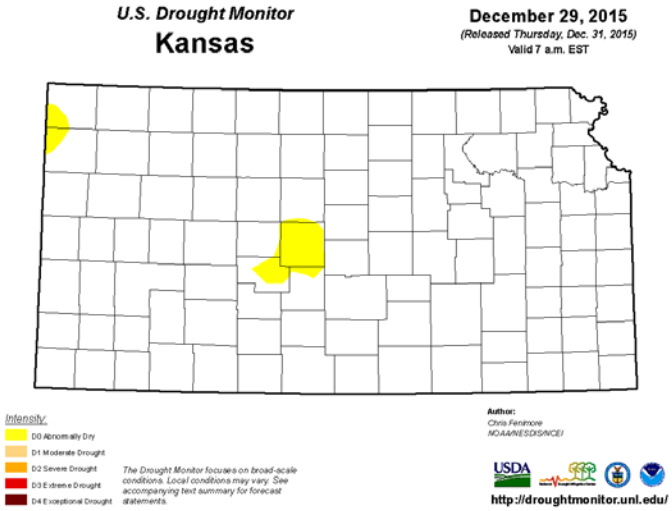
Federal funding is available on a cost-sharing basis for hazard mitigation measures statewide. More information may be found at http://www.fema.gov/news-release/2015/07/20/federal-aid-programs-state-kansas-declaration.

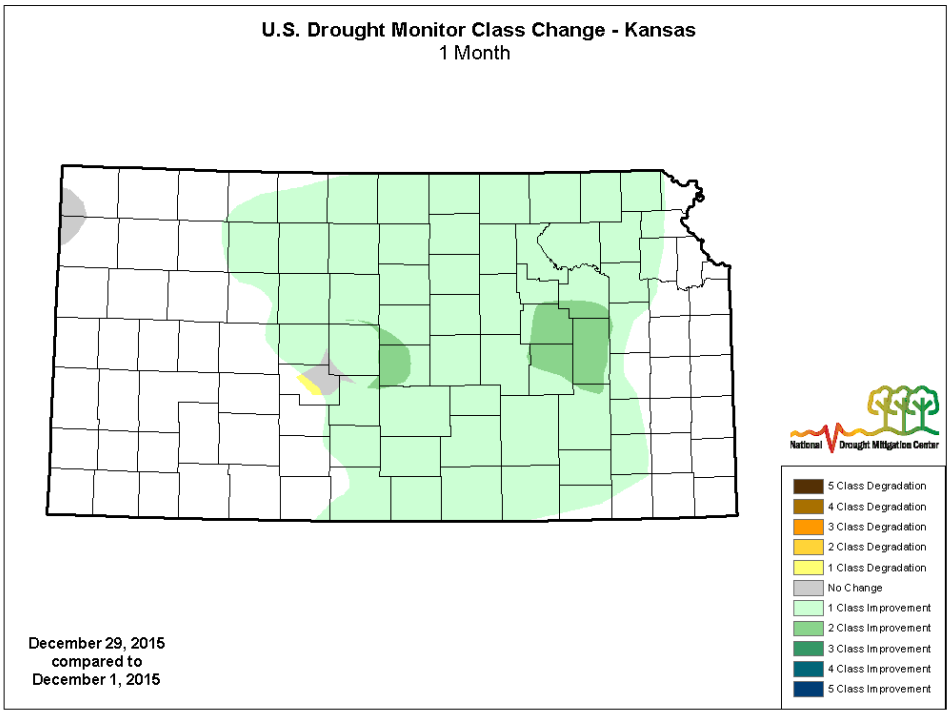
General Conditions

Drought conditions continue to improve. Moderate drought conditions were eliminated, and the area of abnormal dry conditions greatly reduced during the month. Pockets of abnormally dry conditions remain in parts of Central and northwestern Kansas.

More information on the Drought Monitor categories can be found in a separate document under useful links on the KWO drought page.



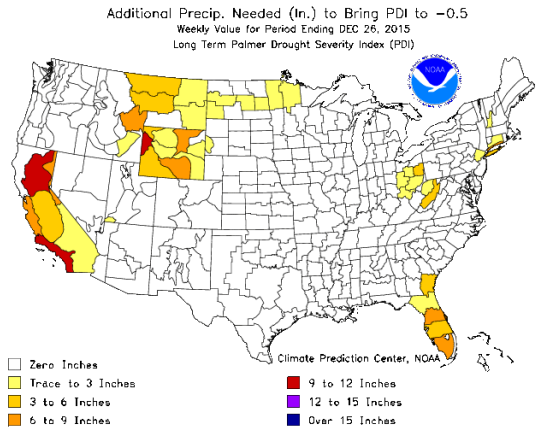




http://droughtmonitor.unl.edu

Palmer Drought Severity Index - The Palmer Index (PDSI) is an indicator used in the U.S. Drought Monitor. The precipitation needed in Kansas to bring the Palmer Drought Index to near normal (-0.5) is shown in the map below. (http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/addpcp.gif)

The next table provides climate division moisture needs to end drought.



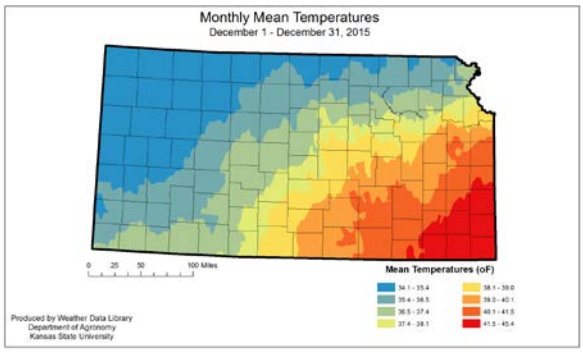
Climate Division	Precipitation needed to End Drought (inches)			
	Week ending December 5	Week ending December 12	Week ending December 19	Week ending December 26
Northwest	-	0.32	-	-
West Central	-	-	-	-
Southwest	-	-	-	-
North Central	-	-	-	-
Central	-	-	-	-
South Central	-	-	-	-
Northeast	-	-	-	-
East Central	-	-	-	-
Southeast	-	-	-	-

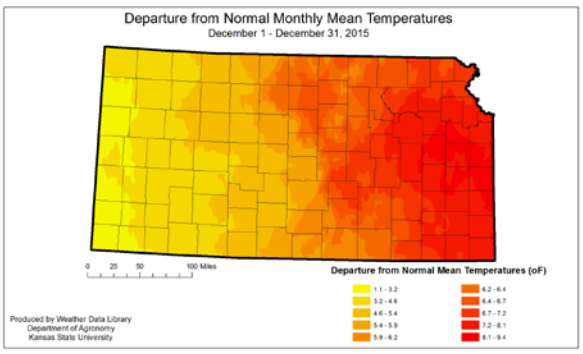
Climate Summary (Temperature and Precipitation)

The overall pattern for December 2015 was much wetter and warmer than normal conditions. December 2015 was the 4th warmest December on record. The state-wide average temperature was 37.7°F, or 5.6 degrees warmer than normal. The western divisions were the closest to normal, with departures ranging from +3.6°F in the West Central Climate Division to +3.8°F in the Southwest Climate Division. The East Central Division had the greatest departure from normal, with an average of 38.6°F, or 7.4 degrees warmer than normal. There were 79 new daily high maximum temperature records set, although none of these were record highs for the month. In addition, 95 record warm minimum temperatures were recorded. One, 62°F recorded at Independence, KS on the 13th, was a new record warm minimum for December. The warmest reading for the month was 75°F at Wilmore (Comanche County) on the 10th. The coldest reading was 3°F, recorded at both Tribune (Greeley County) and St. Francis (Cheyenne County) on the 18th.

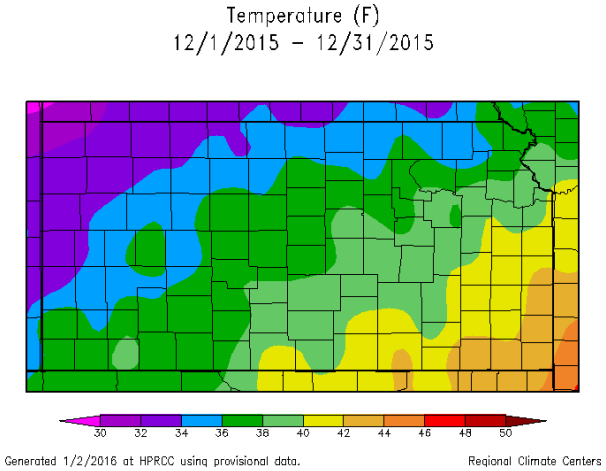
Temperature summary by the Kansas State University Weather Library for the month is provided in the table and maps below. The table below summarizes temperatures by Kansas climate division and various time periods. Slight differences in the average or extreme values presented may occur due to preliminary data.

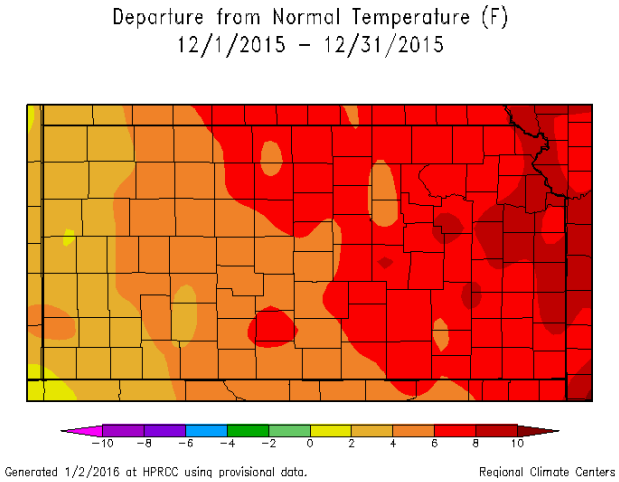
Climate Division	Kansas Climate Division Temperature Summary (°F)							
	December 2015							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	44.1	21.5	32.8	3.7	73	9	3	18
West Central	45.8	22.5	34.2	3.6	72	10	3	18
Southwest	48.0	25.0	36.5	3.8	74	10	8	18
North Central	45.8	25.5	35.6	6.3	72	10	10	25
Central	47.7	26.9	37.3	5.9	73	10	9	29
South Central	50.5	28.3	39.4	6.1	75	10	9	18
Northeast	47.1	25.5	36.3	6.5	67	10	10	18
East Central	49.5	28.4	38.9	7.4	70	9	15	18
Southeast	52.0	30.3	41.2	7.1	72	12	12	18
STATE	47.8	26.0	36.9	5.6	75	10th	3	18th
Data Source: KSU Weather Library								





Temperature summary by the High Plains Regional Climate Center for the month is provided in the maps below.

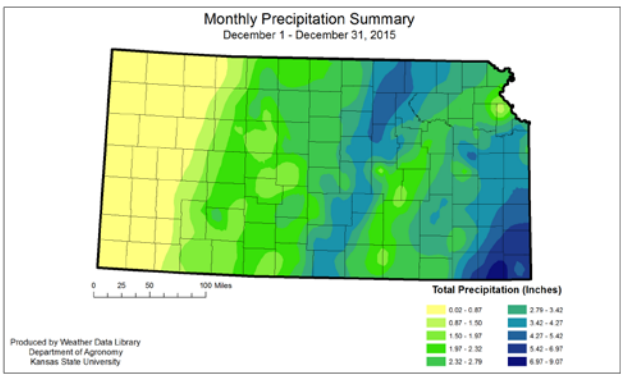


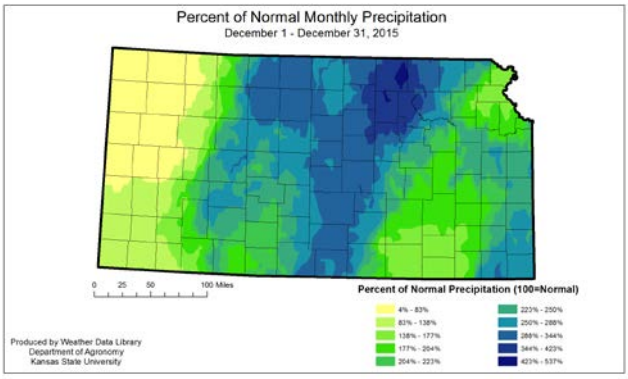


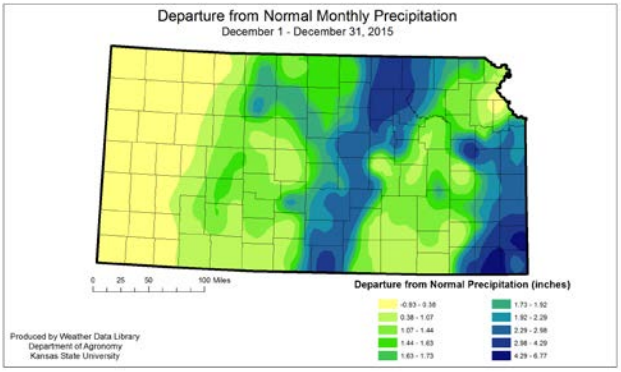
State-wide average precipitation was 2.28 inches. This ranks as the 6th wettest December since 1895. The Northwest Climate Division was the exception to this wet pattern. The divisional average was 0.50 inches, or 80 percent of the normal. In contrast, the West Central Climate Division averaged 2.61 inches of precipitation, which was 289 percent of normal. There were 210 new daily record precipitation amounts. In addition, 37 of those were new daily records for December. The bulk of these records occurred during the December 13-14th event, while a second wave came during a December 27th event. Not surprisingly, there were multiple reports of flooding and flash flooding with both events. The December 27th event was complicated by colder temperatures and freezing rain. This resulted in multiple vehicle accidents and power outages. In Harper County, ice was reported to be 1 inch thick on transmission lines, and 50 poles were down. The greatest daily precipitation totals were 3.43 inches at Pittsburg, Crawford County on the 27th (NWS) and 4.25 inches at Abilene 12.7 S, Dickinson County, on the 14th (CoCoRaHS). The greatest totals for the month were 9.07 inches at Bartlett 1 WSW, Labette County (NWS) and 8.00 inches at Pittsburg 0.7 WSW, Crawford County (CoCoRaHS). Despite the warmer than normal temperatures, snow was a feature during the month. The greatest 24 hour total was 9 inches at Jetmore, Hodgeman County, on the 14th. That was also the greatest monthly total for the state.

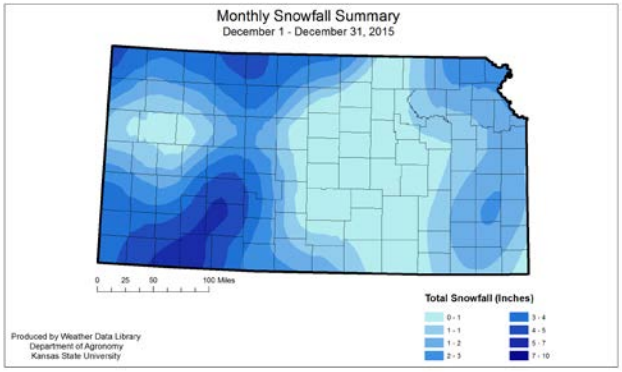
Precipitation summary for the month is provided in the table and maps below from the Kansas State University Weather Library.

Kansas Climate Division Precipitation Summary (inches) - Summary December 2015												
	December 1-31, 2015			January 1– December 31, 2015			April 1– December 31, 2015			September 1–December 31, 2015		
Climate Division	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	0.51	-0.06	82	20.84	-0.52	97	20.28	1.22	106	5.39	0.92	119
West Central	0.78	0.15	109	21.67	0.90	103	20.79	2.52	113	5.33	0.86	116
Southwest	1.20	0.53	172	28.23	8.33	141	26.42	8.90	149	7.25	2.79	159
North Central	2.56	1.68	282	27.45	-0.56	96	26.12	1.57	105	6.95	0.23	103
Central	2.73	1.80	292	28.57	-0.72	96	27.08	1.74	105	7.91	1.10	115
South Central	2.45	1.33	218	34.90	3.58	111	33.25	6.55	124	9.47	1.62	120
Northeast	3.04	1.82	256	39.55	4.55	112	37.30	6.51	120	10.50	1.16	113
East Central	2.88	1.48	199	37.57	-0.35	97	35.42	2.42	106	10.79	0.48	102
Southeast	3.74	1.92	198	41.69	0.20	99	39.61	4.11	110	12.23	0.14	99
STATE	2.22	1.19	201	31.31	1.93	107	29.71	4.17	116	8.48	1.09	117

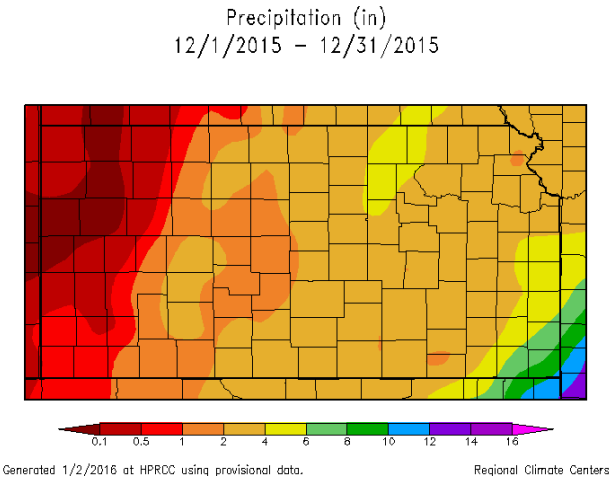


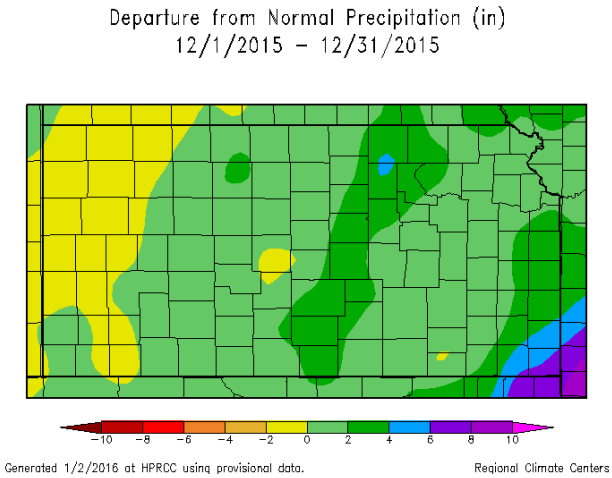






Precipitation summary for the month is provided in the maps below from the High Plains Regional Climate Center. The Climate Center information is provided also as a comparison to the K-State data. Various time intervals can be accessed at the climate center http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps .

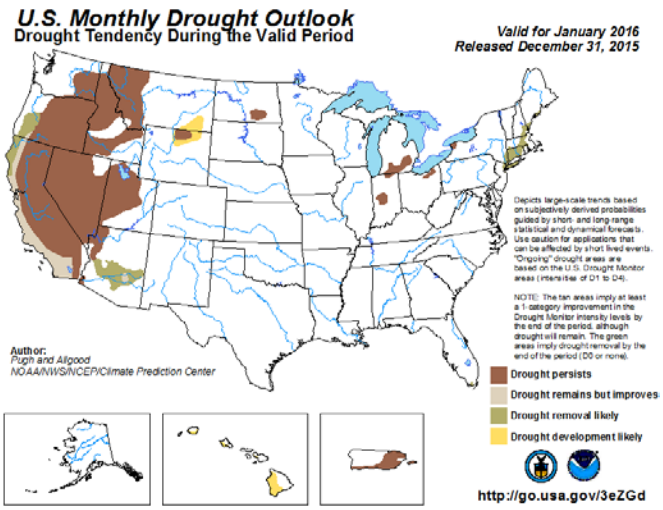


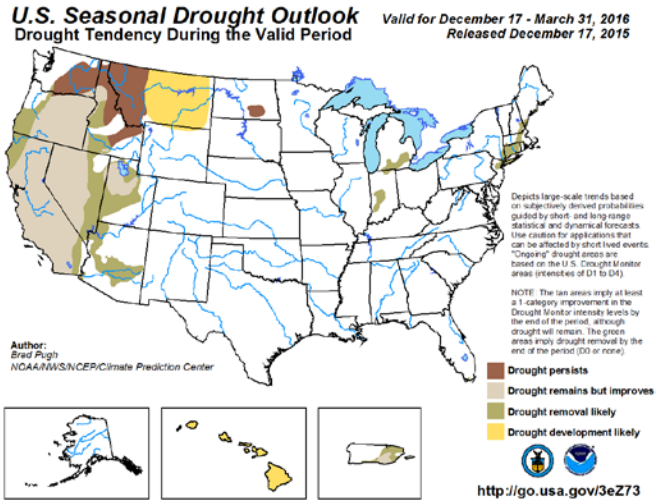


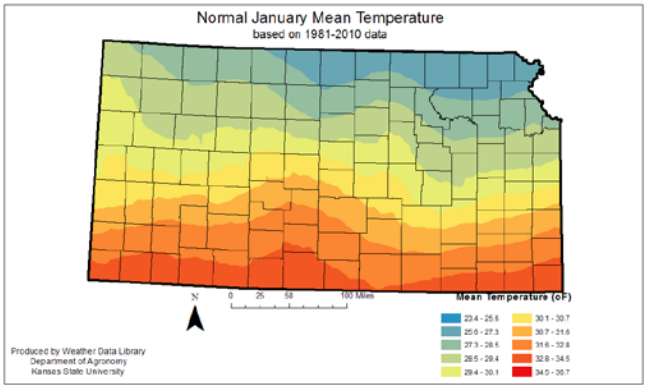
Future Outlook

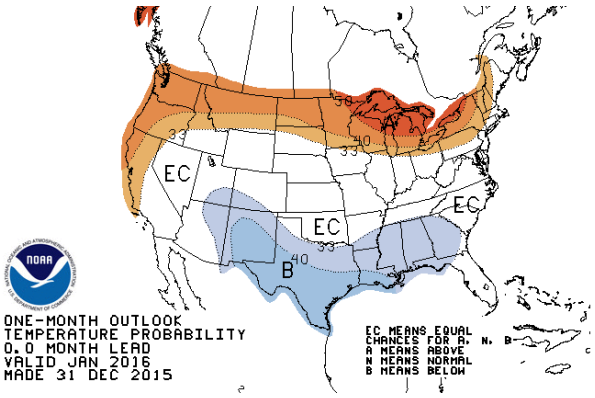
The drought outlook is for improving conditions, and the precipitation outlook for January is neutral. However, we are in a drier period of the year, either above or below normal precipitation will be slow to show impacts.

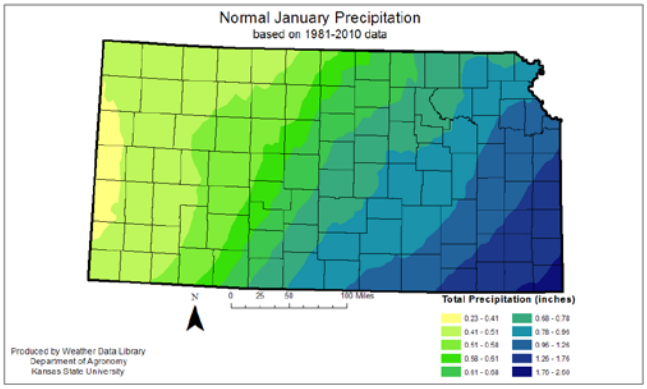
The Drought Outlook for the month of January and the Season Outlook for Mid- December through the end of March 2016 are provided below.

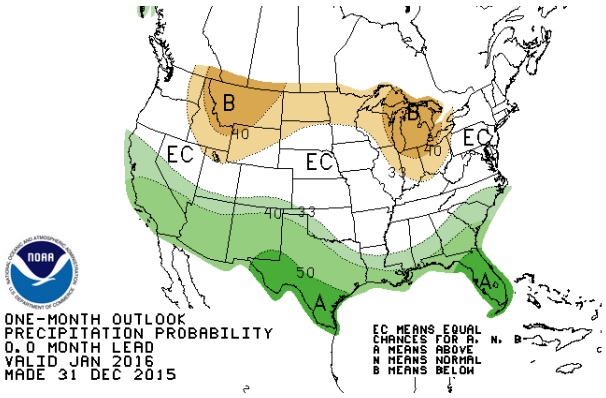




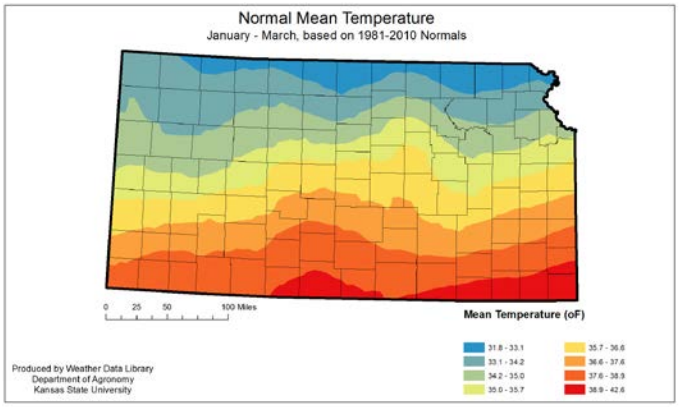


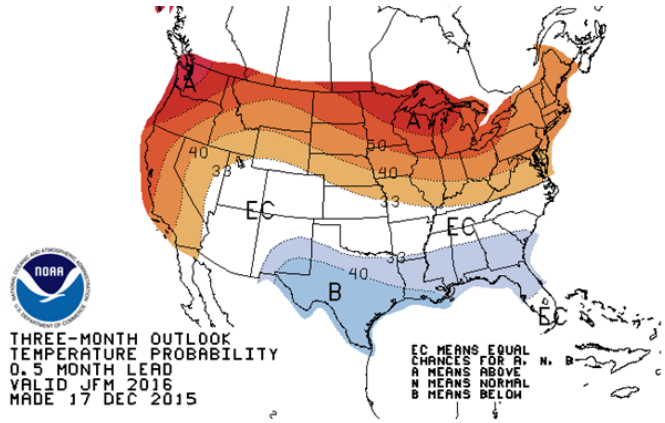


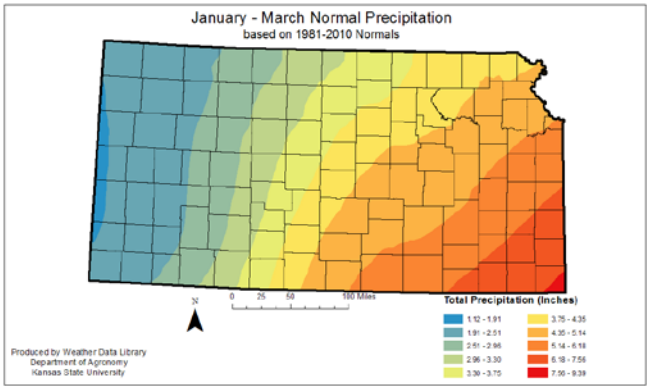


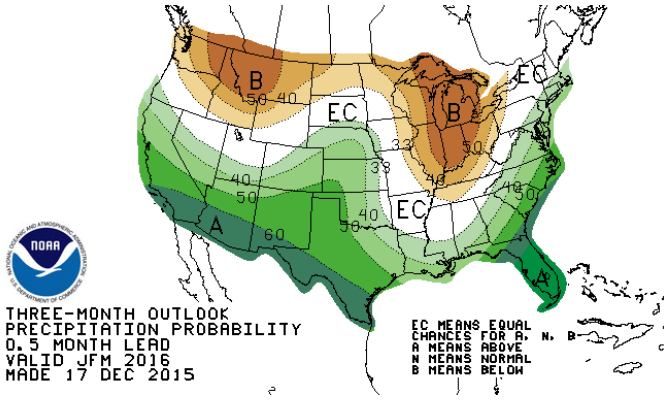


The early winter (three-month) outlook favors normal temperatures and above normal precipitation for December 2015 through February 2016.









Additional outlooks for additional timeframes are available from the national CPC for up to 13 months. (http://www.cpc.ncep.noaa.gov/products/predictions/90day/)

Water

Public Water Supply Conditions

Cities and rural water districts are encouraged to measure their current water supply as well as review and use their conservation and drought emergency plans as needed. Evaluation of experience from this past year and update those plans to make sure they are prepared to address water supply needs should the drought not continue to ease.

Known issues:

Stage II water restrictions are in place for **Russell,** Russell County water customers. The water restrictions include a prohibition on most outdoor watering, vehicle washing, filling of residential swimming pools, and washing exterior of buildings. It also requires industrial users to reduce use.

Stage III water restrictions have been in place for **Victoria**, Ellis County since January 2014. No outdoor watering is allowed.

The City of **Natoma** in Osborne County reported to KDHE declining well water levels causing inability to pump two of three wells. A water watch (conservation plan) has been enacted.

Surface Water Supply Conditions
Kansas River basin: Reservoir inflow and streamflow throughout the system were high for the majority of December. Mid-month rain provided a significant amount of runoff and raised flow values well above median levels. Milford, Tuttle Creek, Perry, and Clinton reservoirs all ended the month with excess storage.

Marais des Cygnes basin: River flow throughout the basin were well above median levels the entire month of December. Melvern, Pomona, and Hillsdale were managed within flood pool operations and ended the month with excess storage.

Cottonwood / Neosho basin: This basin was also relatively wet throughout the month and system storage is healthy. John Redmond Reservoir remained in flood operations all through December and Marion Reservoir required some flood pool releases. Council Grove Reservoir did receive some increased inflow, high for December, but did not quite reach conservation level.

Verdigris basin: River conditions maintained flows above median value for most of the month and occasional flood pool releases were necessary from all system reservoirs during the month.

Saline basin: New record lows were set in the first half of the month but Wilson Lake drainage did receive some precipitation in mid-December and lake levels rose about two tenths of a foot. Flows in the Saline River remained inconsequential throughout the month.

Smoky Hill basin: Despite some rain in the Smoky Hill basin streamflow remained low for December. Kanopolis Reservoir did receive some inflow and releases were minimal so the storage balance was positive. Downstream base flow was encouragingly healthy and the low flow target at the Mentor gage was maintained despite no releases from Kanopolis the first half of the month. Cedar Bluff Reservoir actually experienced a small amount of inflow that resulted in a very modest gain in elevation.

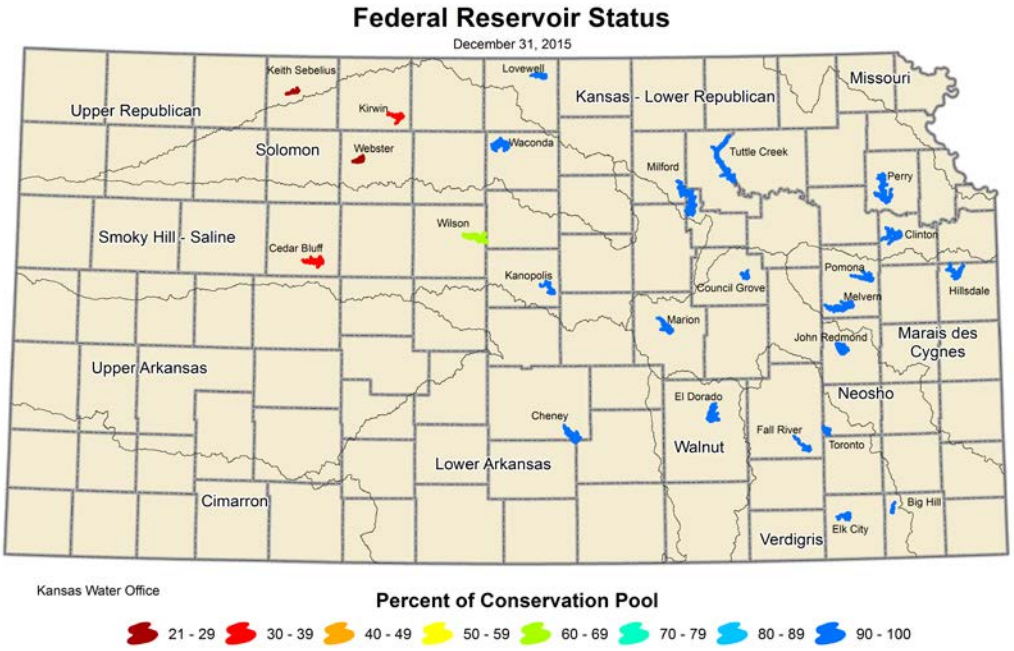
Harmful Blue-Green Algal Blooms (lake water safety)
KDHE has issued two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. These notification levels are determined by the concentration of a harmful toxin(s) or the concentration of cyanobacteria cell counts.

November 17, 2015 the sampling season closed. Leaving two lakes on the warning list until the 2016 sampling season (April 1-Oct 31), Hiawatha City Lake, Brown County; and Plainville Township Lake, Rooks County.

Public Health Watch–Notifies public that a hazardous condition may exist, that the water may be unsafe for humans and animals and contact with the water is discouraged.

Public Health Warning–Notifies public that conditions are unsafe, that contact with the water should not occur, and all conditions of Public Health Watch remain in effect.

General Reservoir Conditions
The conservation pools at the water supply reservoirs in eastern Kansas are full. The four westernmost reservoirs, Norton, Cedar Bluff, Webster and Kirwin are significantly below conservation pool. Wilson Reservoir is also relatively low at only 66% of conservation pool.



Kansas Federal Reservoir Conservation Pool Levels

Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin		**12/30/2015 06:00 AM**		
Norton[1]	2304.3	2287.74	-16.56	27.3
Harlan County, NE	1945.73	1932.82	-12.91	53.2
Lovewell[1]	1582.6	1582.13	-0.47	96.2
Milford[1]	1144.4	1144.33	-0.07	99.7
Cedar Bluff	2144	2119.28	-24.72	32.4
Kanopolis[1]	1463	1463.46	0.46	100.0
Wilson[1]	1516	1505.87	-10.13	66.4
Webster[1]	1892.5	1870.03	-22.42	22.8
Kirwin[1]	1729.3	1713.10	-16.15	36.1
Waconda[1]	1455.6	1455.15	-0.45	97.4
Tuttle Creek[1]	1075	1081.77	6.77	100.0
Perry[1]	891.5	892.37	0.87	100.0
Clinton[1]	875.5	879.47	3.97	100.0
Melvern[1]	1036	1036.13	0.13	100.0
Pomona[1]	974	976.52	2.52	100.0
Hillsdale[1]	917	918.58	1.58	100.0
Arkansas River Basin		**12/29/2015 08:00 AM**		
Cheney	1421.6	1422.16	0.56	100.0
El Dorado	1339	1338.54	-0.46	98.0
Toronto[1]	901.5	906.98	5.48	100.0
Fall River[1]	948.5	950.86	2.36	100.0
Elk City[1]	796	800.04	4.04	100.0
Big Hill	858	859.45	1.45	100.0
Council Grove[1]	1274	1273.92	-0.08	100.0
Marion[1]	1350.5	1351.47	0.97	100.0
John Redmond[1]	1039	1043.17	2.17	100.0

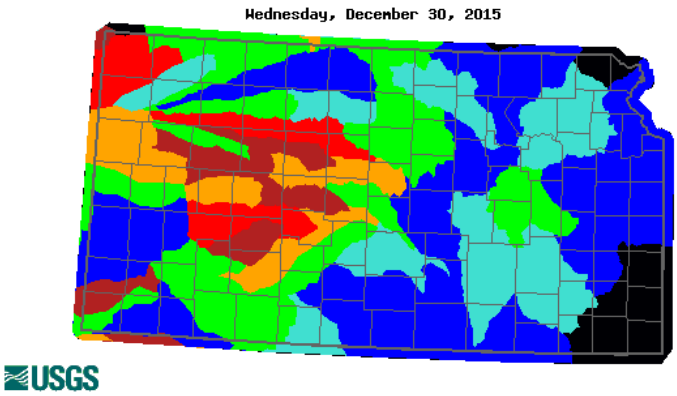
[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers

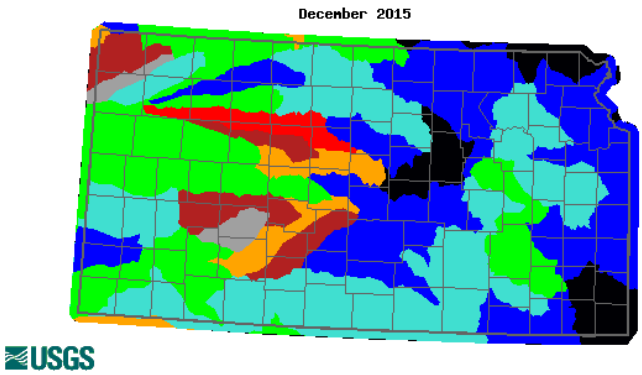
Note: The conservation pool is the water storage for non-flood purposes of the reservoir, set by the elevation of the top of the pool.
* Data from 11/02/2015 6 am, unavailable 11/1/15

Streamflow Conditions

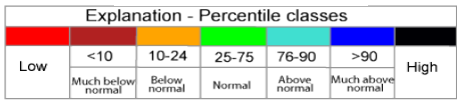
Kansas streamflows during July varied across the state, but remain below historical normal flows in parts of west and central Kansas.

The comparison of present **7-day** streamflow to historical is shown on the map below left and the **December** streamflow compared to historical is shown on the map below, right. Short term streamflow is significantly lower than historical average in many area of western Kansas.

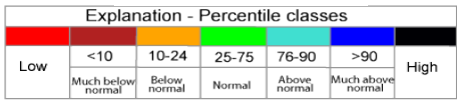




7-day streamflow



Monthly streamflow



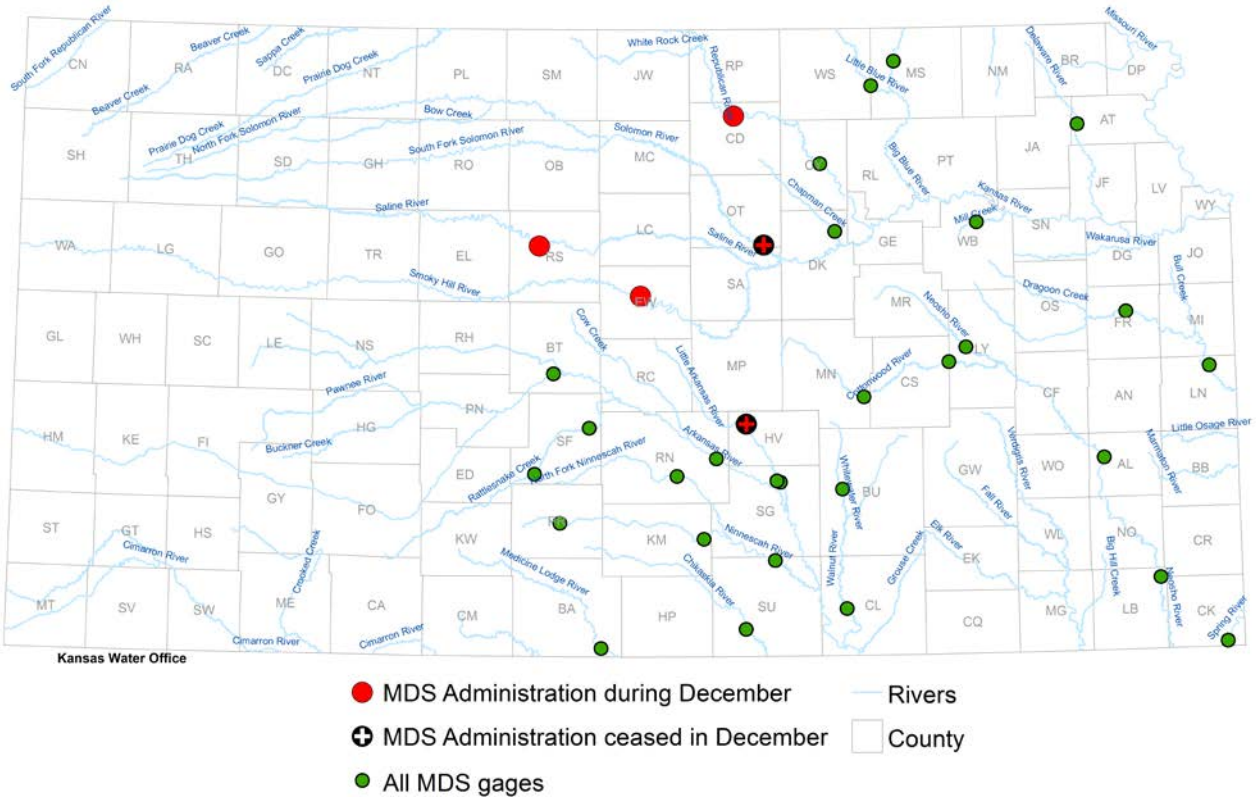
In general, a streamflow which is greater than the 75 percentile is considered *above normal*, a streamflow which is between 25 and 75 percentiles is considered *normal* and a streamflow which is less than the 25 percentile is considered *below normal*. Color codes are for basins with streamflow averages less than 25 percent of historic values.

Water Right Administration/Minimum Desirable Streamflow (MDS)

Minimum Desirable Streamflow (MDS) is being administered in Kansas. MDS administration requires water rights junior to MDS, usually with priority dates after April 12, 1984, to stop diverting water. Administration is ordered when streamflow drops below MDS for more than seven days.

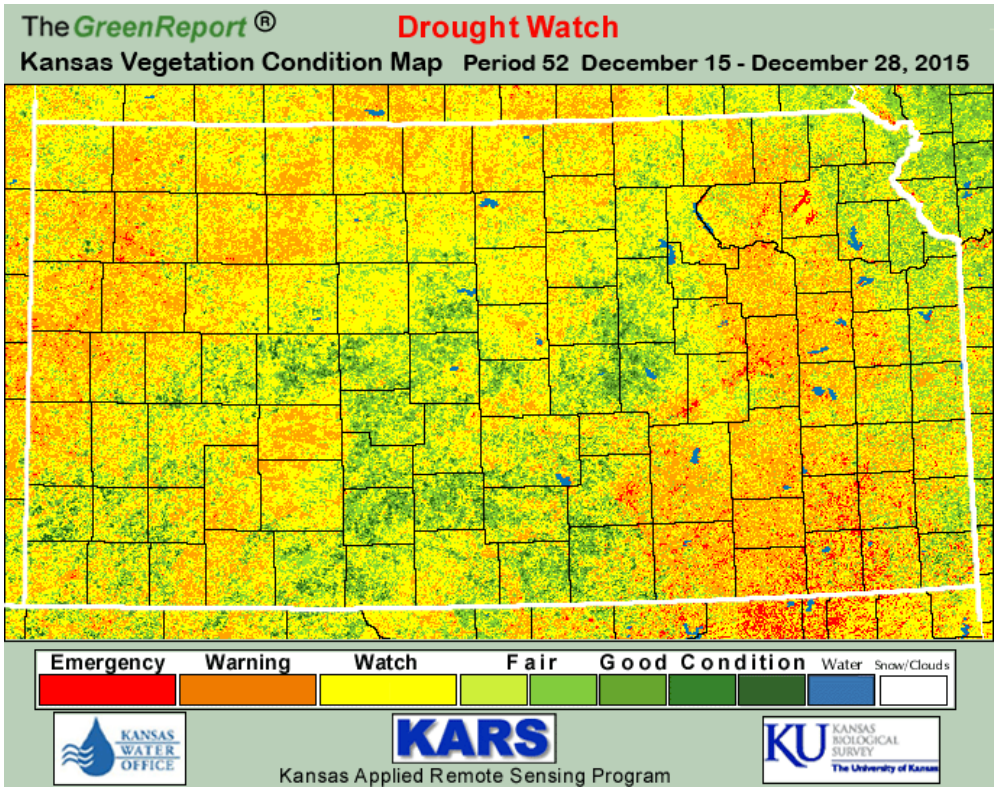
Streamflows in cubic feet per second (cfs)									
Gaging Station	**Flow Dec 3**	**Flow Dec 10**	**Flow Dec 17**	**Flow Dec 23**	**Flow Dec 31**	**Dec MDS**	**Jan MDS**	**Administration Date**	**Number of Rights Admin.**
Republican River at Concordia	74	74	547	278	242	100	100	11/18/15	70
Republican River at Clay Center	133	126	932	344	205	125	125	03/20/15; ceased 05/29/15	
Smoky Hill River at Ellsworth	8	8	64	25	14	20	20	03/23/15	3
Saline River near Russell	1	1	2	2	1.4	5	5	9/5/15	10
Solomon River at Niles	57	75	976	350	299	40	40	11/18/15 ceased 12/3/15	
Little Arkansas River at Alta Mills	491	20	590	84	41	8	8	9/14/15 ceased 12/15/15	
								TOTAL	83

Kansas Minimum Desirable Streamflow (MDS) Gages Administration
December 31, 2015



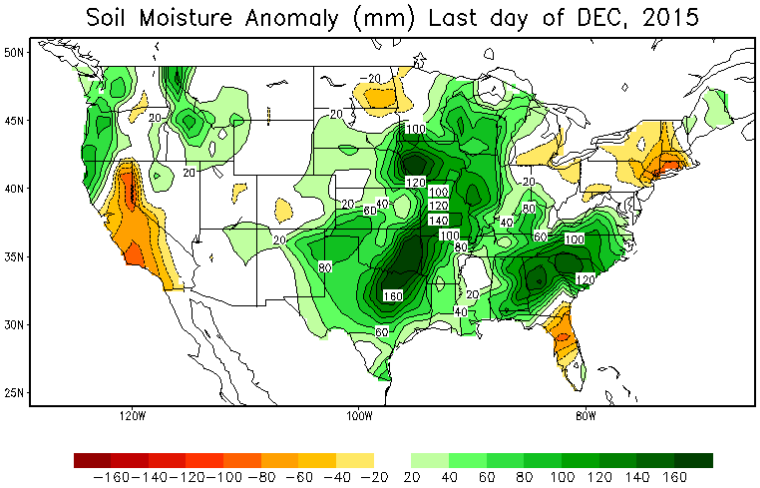
Soil, Crop and Vegetation
Kansas Vegetative Conditions

The Kansas Vegetative Condition map is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Green colors indicate areas where winter wheat is growing and in good shape.



Soil Moisture

The Climate Prediction Center (CPC), also monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml



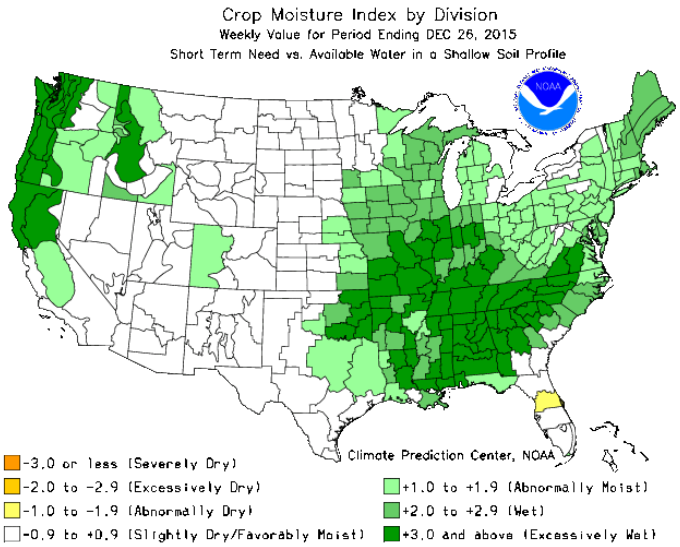
Soil erosion from winds is increased when vegetation is sparse and soils dry as in drought. K-State Research and Extension has publications on mitigating wind erosion which may be found at: http://www.ksre.ksu.edu/p.aspx?tabid=255.

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, and livestock feed and water supplies. The Kansas report for the month of December 2015 reported topsoil moisture rated 5 percent very short, 14 short, 71 adequate, and 10 surplus. Subsoil moisture rated 6 percent very short, 19 short, 71 adequate, and 4 surplus.

Field Crops Report: Winter wheat condition rated 1 percent very poor, 7 poor, 38 fair, 46 good and 8 excellent.

Livestock Report: Cattle and calf conditions rated 0 percent very poor, 1 poor, 30 fair, 63 good and 6 excellent.
Hay and roughage supplies rated 0 percent very short, 3 short, 85 adequate, 12 surplus.
Stock water supplies rated 4 percent very short, 10 short, 84 adequate, and 2 surplus.
(http://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/current.pdf)

The Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a climate division, as well as the CMI value from the previous week. The CMI responds rapidly to changing conditions, and it is weighted by location and time so that maps, which commonly display the weekly CMI across the United States, can be used to compare moisture conditions at different locations. Weekly maps of the CMI are available as part of the USDA/JAWF Weekly Weather and Crop Bulletin.



Whenever the Governor or the U.S. Department of Agriculture declares all or any portion of the State is in a state of drought, certain conditions apply to motor carriers transporting hay or related animal forage feedstuffs to the geographic area specified in the drought declaration. Those certain conditions are as follows:

- Motor carrier registration and fuel tax permits are temporarily suspended;
- Licensing, certification, and permitting rules and regulations of the State Corporation Commission are temporarily suspended;

- These motor carriers may not operate during the period beginning 30 minutes after sunset and ending 30 minutes before sunrise and are required to comply with flags, signs, and lighting requirements applicable to over width vehicles;
- Motor carriers cannot operate during inclement weather;
- Oversize and overweight loads cannot be transported when visibility is less than one-half mile or when conditions of moderate to heavy rain, sleet, snow, fog, or smoke exist, or when highway surfaces are slippery due to ice or packed snow; and
- Motor carriers cannot transport a load of more than 12 feet in width and 14 feet, six inches, in height.

The provisions remain in effect until the drought declaration is terminated.

General Federal Disaster Assistance

USDA has financial and technical assistance to immediately help crop and livestock producers in cope with the adverse impacts of the historic drought. More information on these programs may be found at http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE.

USDA's Rural Development works with existing individual and community borrowers that have been affected by a natural disaster to help them with their loans. With respect to loans guaranteed by Rural Development, borrowers should initially contact their lender for assistance.

USDA's Farm Service Agency (FSA) provides emergency loans through the Emergency Loan Program to help producers recover from production and physical losses due to natural disasters. Producers were eligible for these loans as soon as their county was declared a Presidential or Secretarial disaster county. More information may be found at: http://www.fsa.usda.gov/FSA/webapp?area=home&subject=diap&topic=landing and http://www.fsa.usda.gov/Internet/FSA_File/disasterfsaprograms.pdf.

USDA's Risk Management Agency aids producers on crop losses, those with questions should contact their crop insurance companies and local USDA Farm Service Agency Service Centers, as applicable, to report damages to crops or livestock loss, and not to destroy or discontinue care for your crops. Livestock producers need to keep thorough records of losses, including additional expenses for such things as food purchased due to lost supplies. USDA Risk Management Agency information on crop insurance and drought damaged crops can be found at: http://www.rma.usda.gov/fields/ks_rso/2011/droughtfaq.pdf.

USDA's NRCS administers the Emergency Watershed Protection Program, which provides assistance to areas that have been damaged by natural disasters, such as floods, windstorms, drought, and wildfires. In partnership and through local government sponsors, NRCS helps local communities recover from natural disasters.

The USDA Food and Nutrition Service provide food assistance to those in need in areas affected by a disaster. This Federal assistance is in addition to that provided by State and local governments. USDA provides disaster food assistance in three ways: provides foods to State agencies for distribution to shelters and other mass feeding sites; provides food to State agencies for distribution directly to households in need in certain limited situations; and authorizes State agencies to issue Disaster Supplemental Nutrition Assistance Program (D-SNAP) benefits.

Drought related program information is found at: http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE&navtype=RT&parentnav=RURAL_DEVELOPMENT.

Forms for disaster relief programs are found at: http://www.disasterassistance.gov/federal-agency/2.

Livestock

The 2014 Farm Bill makes the **Livestock Forage Disaster Program (LFP)** a permanent program and provides retroactive authority to cover eligible losses back to Oct. 1, 2011. LFP provides compensation to eligible livestock producers who have suffered grazing losses due to drought or fire. LFP payments for drought are equal to 60 percent of the monthly feed cost for up to five months. LFP payments for fire on federally managed rangeland are equal to 50 percent of the monthly feed cost for the number of days the producer is prohibited from grazing the managed rangeland,

not to exceed 180 calendar days. The grazing losses must have occurred on or after Oct. 1, 2011. More detailed information on eligibility and sign up is available on the FSA fact sheet found at: http://www.fsa.usda.gov/Internet/FSA_File/lfp_2014_fbill.pdf

An eligibility tool keyed to the U.S. Drought Monitor is available at: http://droughtmonitor.unl.edu/fsa/FsaEligibilityCounty.aspx

The 2014 Farm Bill makes the **Livestock Indemnity Payments (LIP)** a permanent program and provides retroactive authority to cover eligible livestock losses back to Oct. 1, 2011. LIP provides compensation to eligible livestock producers who have suffered livestock death losses in excess of normal mortality due to adverse weather and attacks by animals reintroduced into the wild by the federal government or protected by federal law, including wolves and avian predators. LIP payments are equal to 75 percent of the market value of the applicable livestock on the day before the date of death of the livestock. Fact sheet is available at http://www.fsa.usda.gov/Internet/FSA_File/lip_pf_022414_1.pdf.

Emergency Assistance for Livestock, Honey Bees, and Farm-Raised Fish (ELAP): ELAP provides emergency assistance to eligible producers of livestock, honeybees and farm-raised fish for losses due to disease (including cattle tick fever), adverse weather, or other conditions, such as blizzards and wildfires, not covered by LFP and LIP.

Other Federal Disaster Assistance for Producers

Department of Transportation Emergency Exemptions of Federal Operating Requirements: This authority can put more commercial drivers behind the wheel-driving large trucks needed to assist the farmers and ranchers in need. If a qualifying drought emergency has been declared in a state by the Governor or appropriate official, the state automatically gets Hours of Service and other regulatory relief for those providing emergency assistance; no application is needed. If the situation does not qualify for emergency relief, the Federal rules regulating large truck and bus operations may be waived in certain circumstances. DOT can process a request to waive regulations in 7-14 days.

Department of Interior grazing on Federal lands: The Department of the Interior's Bureau of Land Management (BLM) and the USDA Forest Service are providing relief to ranchers who graze on public lands by employing flexibility to accommodate needs and conditions on the ground.

Tree Assistance Program (TAP): TAP provides financial assistance to qualifying orchardists and nursery tree growers to replant or rehabilitate eligible trees, bushes, and vines damaged by natural disasters through FSA.

Conservation Reserve Program (CRP) – CRP acres may be used for haying or grazing under emergency conditions. CRP is a voluntary program that provides producers with annual rental payments on their land in exchange for planting resource-conserving crops on cropland to help prevent erosion, provide wildlife habitat and improve the environment. CRP acres can already be used for emergency haying and grazing during natural disasters to provide much needed feed to livestock. Given the widespread nature of this drought, forage for livestock is already substantially reduced. Haying and grazing will only be allowed following the local birds' primary nesting seasons. Especially sensitive lands, such as wetlands, stream buffers and rare habitats will not normally eligible.

Environmental Quality Incentives Program (EQIP) – This program provides assistance to farmers and ranchers by allowing them to modify current EQIP contracts to allow for prescribed grazing, livestock watering facilities, water conservation and other conservation activities to address drought conditions. EQIP is a voluntary program that provides financial and technical assistance to agricultural producers to address natural resource concerns on their agricultural and forest land. The USDA Natural Resources Conservation Service (NRCS) will work closely with producers to modify existing EQIP contracts to ensure successful implementation of planned conservation practices. Where conservation activities have failed because of drought, NRCS will look for opportunities to work with farmers and ranchers to re-apply those activities. In the short term, funding will be targeted towards hardest hit drought areas.

Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report is compiled at least monthly, more frequently when conditions warrant, by the KWO. Information from various federal, state, local and academic sources is used. Some of the data is preliminary and subject to change once final data is available. 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. Kansas State Climatologist, Mary Knapp, is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at Evapotranspiration (ET) and Mesonet sites across Kansas are available at http://www.ksre.k-state.edu/wdl/.

RESOURCES and ACTIVITIES

The U.S. Drought Monitor, from the National Drought Mitigation Center at the University of Nebraska-Lincoln, provides a "big picture" perspective of conditions across the nation. 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 one indicator used in the U.S. Drought Monitor.

The High Plains Regional Climate Center provides precipitation and temperature summary maps.

The U.S. Geological Survey (USGS) Drought Watch provides information average streamflow measured at long-term gaging stations and compares them to normal flows.

The Kansas Department of Agriculture-Division of Water Resources monitors stream flow using the USGS gages for determination of administrative needs. Administration may be needed due to Minimum Desirable Streamflow (MDS) requirements, impairments, and reservoir release protection.

The water levels of the federal 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.

The Kansas Applied Remote Sensing Program (KARS) at the University of Kansas produces a Kansas Green Report each week during the growing season. For a full set of national and regional ***GreenReport***® maps, go to: http://www.kars.ku.edu/products/greenreport/greenreport.shtml. This Kansas Vegetation Drought Response Index map is developed weekly by the Kansas Biological Survey using state drought triggers as its key. In addition the Vegetation Drought Response Index, by the National Drought Mitigation Center provides another a national perspective on vegetation conditions. VegDRI maps may be found at http://vegdri.unl.edu/

The National Weather Service (NWS) provides fire weather products and services for Kansas that include the Rangeland Fire Danger Index, Fire Weather Forecasts, Red Flag Watches/Warnings, and Spot Forecasts. The five NWS offices that serve Kansas websites may be accessed from the NWS Offices' page.

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. Also see:

http://www.ncdc.noaa.gov/oa/climate/research/dm/weekly-dm-animations.html

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. The 2007 Municipal Water Conservation Plan Guidelines and the Drought Vulnerability Assessment Report, both by Kansas Water Office, provide guidance regarding drought preparedness and response.

USDA has programs for agricultural producers and businesses for drought affected areas. In some cases a eligibility is dependent on a federal disaster declaration but other programs are triggered by specific conditions.

Please contact Diane Knowles at the Kansas Water Office (785) 296-3185 or diane.knowles@kwo.ks.gov should you have any questions or suggestions.

Appendix A

December 2015 Summary	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
Station[1]	Total	Departure	Percent Normal	Mean	Departure	Highest	Lowest
West							
Burlington, CO	0.26	-0.17	60%	32.6	3.7	72 (9)	6 (29,24)
Dodge City	2.43	1.59	289%	36.5	3.7	69 (11)	11 (29)
Garden City	1.10	0.58	212%	35.7	4.0	71 (9)	10 (29)
Goodland	0.16	-0.30	35%	33.0	3.1	73 (9)	6 (30)
Guymon, OK	0.84	0.20	131%	33.8	3.7	77 (11)	14 (30)
Hill City	1.86	1.17	270%	35.3	5.0	71 (9)	8 (29)
Lamar, CO	0.19	-0.21	48%	34.2	4.6	72 (9)	4 (30)
McCook, NE	0.16	-0.48	25%	33.0	5.0	70 (9)	9 (29)
Springfield, CO	0.09	-0.42	18%	33.3	1.0	71 (9)	6 (30)
Central							
Concordia	2.64	1.79	311%	36.5	6.5	66 (9)	15 (29)
Hebron, NE				34.7	6.8	65 (9)	11 (29)
Medicine Lodge	2.37	1.45	258%	40.1	5.4	73 (11)	14 (18)
Ponca City, OK	2.43	1.01	171%	43.7	7.1	71 (12,11)	18 (29)
Salina	3.66	2.72	389%	39.0	6.7	71 (9)	18 (29,18)
Wichita (ICT)	2.22	1.02	185%	41.1	73.0	66 (11,10)	17 (18)
East							
Bartlesville, OK	5.65	3.44	256%	42.5	6.0	75 (11)	20 (18,17)
Chanute	3.55	1.80	203%	41.8	7.1	71 (12)	18 (30,18)
Fall City, NE	3.05	2.07	311%	37.0	8.0	63 (9)	15 (29)
Johnson Co. Exec. Apt	3.80	2.16	232%	40.1	7.7	67 (12)	18 (30,29)
Joplin, MO	9.77	6.95	346%	44.3	7.1	72 (12,11)	20 (18)
Kansas City (MCI), MO	3.24	1.71	212%	39.7	8.2	65 (12)	15 (29)
St. Joseph, MO	2.25	0.73	148%	38.1	8.7	62 (12,10)	14 (29)
Topeka (TOP	2.71	1.36	201%	39.9	7.9	70 (9)	19 (30,29)

1. Airport Automated Observation Stations (NWS/FAA)
2. Departure from 1981-2010 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