

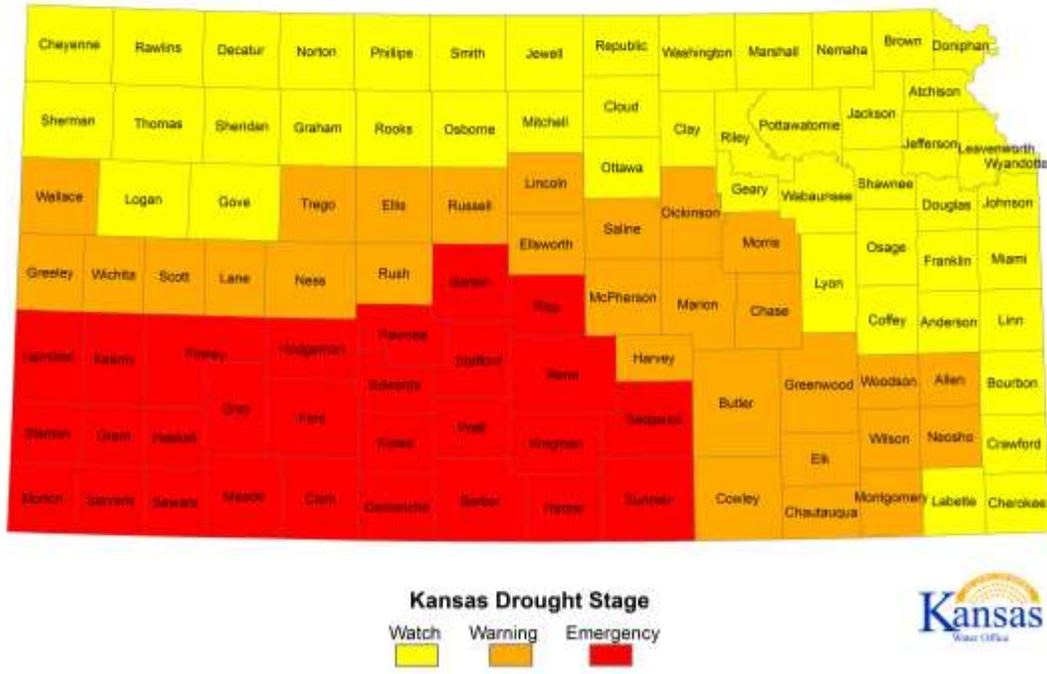


General Overview

- U.S. Drought Monitor indicates over 27% of Kansas in extreme drought, with severe drought covering nearly 60% of the state. Exceptional drought expanded to include all or portions of 11 southwestern counties, now covering 7% of Kansas
- Drought Declarations for Kansas counties under Executive Order 18-11, issued March 13, 2018 includes all 105 counties placing 28 counties in emergency status, 29 into a warning status and 48 into a watch status.
- USDA Drought Disaster Designations as of April 11, 2018 have been made for 48 primary counties and 20 contiguous counties in Kansas.
- USDA-FSA has approved CRP acreages some counties for grazing or haying and grazing. FSA must receive a written request to start the approval process. Twenty-eight counties are approved for emergency haying and grazing. Five counties are approved for emergency grazing only.
- Administration was effective April 13, 2018, on the Republican River from the Clay Center gage to state line, covering 225 water rights.
- Administration was effective on Mill Creek above the gage near Paxico, April 12, 2018 covering 14 water rights.
- Administration was effective on the Whitewater River above the gage near Towanda, April 12, 2018 covering 11 water rights
- Administration was put in effect March 23, 2018 for 40 water rights above the Muscotah gage on the Delaware River.
- Water Rights above the USGS gage on the Little Arkansas River at Alta Vista have been administrated under Minimum Desirable Streamflow (MDS) since August 10, 2017.

March 13, 2018 Governor Orders Drought Declaration for all Kansas Counties - Executive Order 18-11
 Governor Jeff Colyer, MD issued Drought Declarations for Kansas counties with Executive Order 18-11. The declaration includes all 105 counties placing 28 counties in emergency status, 29 into a warning status and 48 into a watch status.

Kansas Drought Declarations March 13, 2018



Drought Watch counties: Anderson, Atchison, Bourbon, Brown, Cherokee, Cheyenne, Clay, Cloud, Coffey, Crawford, Decatur, Doniphan, Douglas, Franklin, Geary, Gove, Graham, Jackson, Jefferson, Jewell, Johnson, Labette, Leavenworth, Linn, Logan, Lyon, Marshall, Miami, Mitchell, Nemaha, Norton, Osage, Osborne, Ottawa, Phillips, Pottawatomie, Rawlins, Republic, Riley, Rooks, Shawnee, Sheridan, Sherman, Smith, Thomas, Wabaunsee, Washington, Wyandotte

Drought Warning counties: Allen, Butler, Chautauqua, Chase, Cowley, Dickinson, Elk, Ellis, Ellsworth, Greeley, Greenwood, Harvey, Lane, Lincoln, Marion, McPherson, Montgomery, Morris, Neosho, Ness, Rush, Russell, Saline, Scott, Trego, Wallace, Wichita, Wilson, Woodson

Drought Emergency counties: Barber, Barton, Clark, Comanche, Edwards, Finney, Ford, Grant, Gray, Hamilton, Harper, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Meade, Morton, Pawnee, Pratt, Reno, Rice, Sedgwick, Seward, Stafford, Stanton, Stevens, Sumner

General Conditions

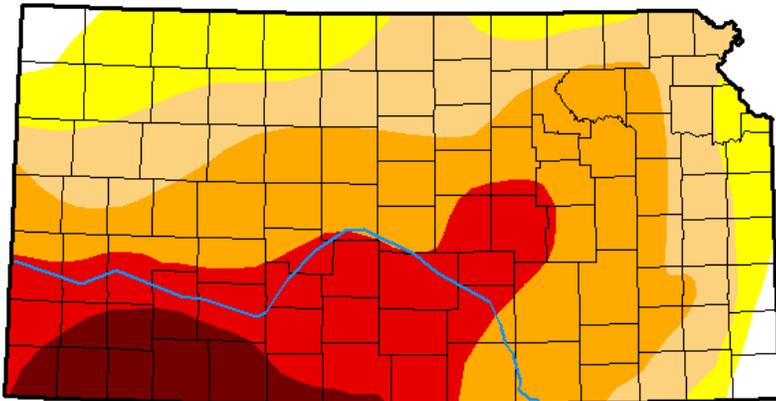
The state drought conditions continue to decline with severity increasing. Exceptional drought conditions now cover just over 7 percent of the state, with extreme drought covers an additional 27 percent of the state. Severe drought has expanded to nearly 60 percent of the state while moderate drought covers an additional 13percent of the state.

**U.S. Drought Monitor
Kansas**

April 10, 2018
(Released Thursday, Apr. 12, 2018)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	2.64	97.36	83.37	59.47	27.06	7.09
Last Week <i>04-03-2018</i>	2.64	97.36	81.66	56.19	25.59	4.32
3 Months Ago <i>01-09-2018</i>	0.00	100.00	52.43	17.23	1.50	0.00
Start of Calendar Year <i>01-02-2018</i>	0.00	100.00	32.70	8.75	0.00	0.00
Start of Water Year <i>09-26-2017</i>	59.89	40.11	10.08	1.35	0.00	0.00
One Year Ago <i>04-11-2017</i>	49.35	50.65	8.55	0.00	0.00	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:

David Miskus
NOAA/NWS/NCEP/CPC



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor Class Change - Kansas
1 Month



April 10, 2018
compared to
March 13, 2018

<http://droughtmonitor.unl.edu>

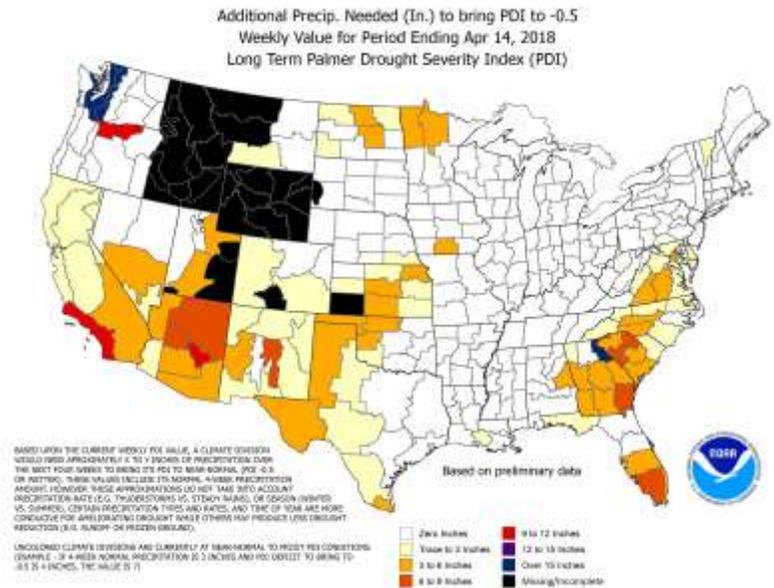
More information on the U.S. Drought Monitor categories can be found at

<http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx>.

Palmer Drought Severity Index (PDSI) - The Palmer Drought Severity Index is an indicator of relative dryness or wetness and is one factor used the U.S. Drought Monitor. The additional precipitation map indicates the inches of precipitation needed to be out of drought.

More information on the PDSI can be found at http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml

Long-term PDI Precipitation needed to remove drought for weeks ending on date		
Climate Division	Apr 7	Apr 14
North Central	2.69	3.10
Northeast	4.90	5.53
West Central	-	0.65
Central	5.27	5.72
East Central	0.58	1.16
Southwest	unknown	unknown
South Central	4.67	5.09
Southeast	-	0.66



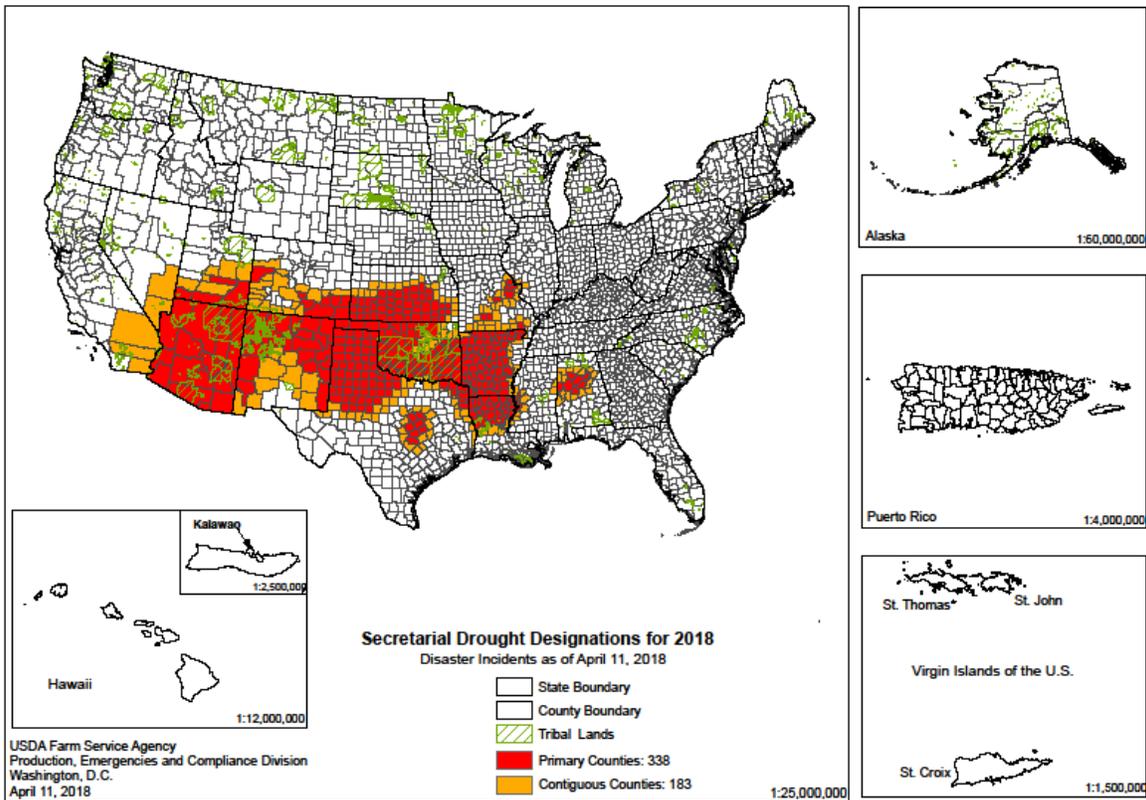
Federal Disaster Drought Declarations 2018

USDA Secretary makes agricultural disaster designations based on crop losses in a designated county. Disaster designations make emergency (EM) loans available to producers suffering losses in those counties and in counties that are contiguous to a designated county. In addition to EM loan eligibility, other emergency assistance programs, such as Farm Service Agency (FSA) disaster assistance programs, have historically used disaster designations as an eligibility trigger.

Designation may be through set process or using Fast Track Secretarial disaster designations for severe drought. Fast Track for drought provides for a nearly automatic designation when, during the growing season, any portion of a county meets the D2 (Severe Drought) drought intensity value for eight consecutive weeks or a higher drought intensity value for any length of time as reported in the U.S. Drought Monitor.

USDA drought disasters have been declared in 2018 for Kansas. Designations are for 48 primary counties and 20 contiguous counties. Primary counties include Allen, Barber, Barton, Butler, Chase, Chautauqua, Clark, Comanche, Cowley, Dickinson, Edwards, Elk, Ellsworth, Finney, Ford, Grant, Gray, Greenwood, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Marion, McPherson, Meade, Montgomery, Morris, Morton, Neosho, Ness, Pawnee, Pratt, Reno, Rice, Rush, Saline, Sedgewick, Seward, Stafford, Stanton, Stevens, Sumner, Wilson and Woodson. Contiguous counties are Anderson, Bourbon, Clay, Coffey, Crawford, Ellis, Geary, Gove, Greeley, Labette, Lane, Lincoln, Linn, Lyon, Ottawa, Russell, Scott, Trego, Wabaunsee and Wichita. (Note those underlined added in April.)

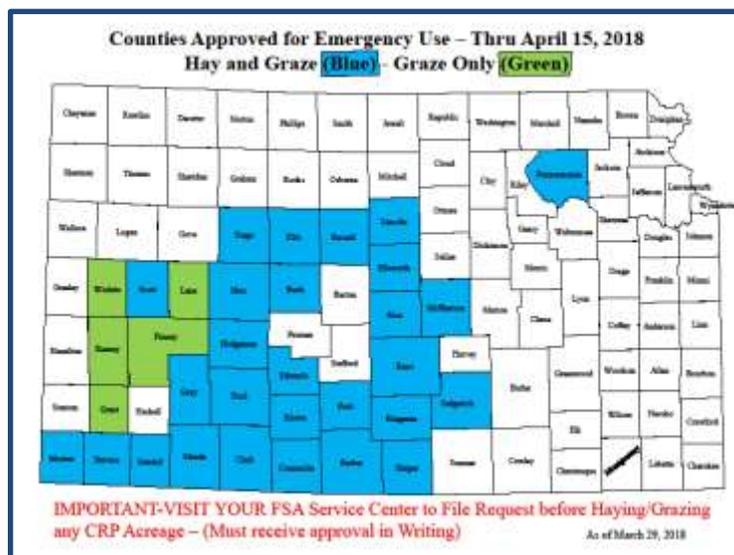
2018 Secretarial Drought Designations - All Drought



Haying and grazing of Conservation Reserve Program (CRP) acres is authorized under certain conditions to improve the quality and performance of the CRP cover or to provide emergency relief to livestock producers due to certain natural disasters. There are two types of haying and grazing authorization: managed and emergency.

USDA-FSA has approved emergency haying and grazing on CRP acreages in some counties in Kansas (March 29, 2018). FSA must receive a written request to start the approval process. Twenty-eight counties are approved for emergency haying and grazing. Five counties are approved for emergency grazing only.

A fact sheet is available at https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/2017/emergency_haying_and_grazing_oct2017.pdf



Presidential Federal Disasters

Presidential major disaster declarations must be requested of the President by a governor. A Presidential disaster declaration allows county governments to apply for Public Assistance funds for emergency work and the repair or replacement of disaster-damaged facilities. It also activates the Hazard Mitigation Grant Program statewide for actions taken to prevent or reduce long term risk to life and property from natural hazards.

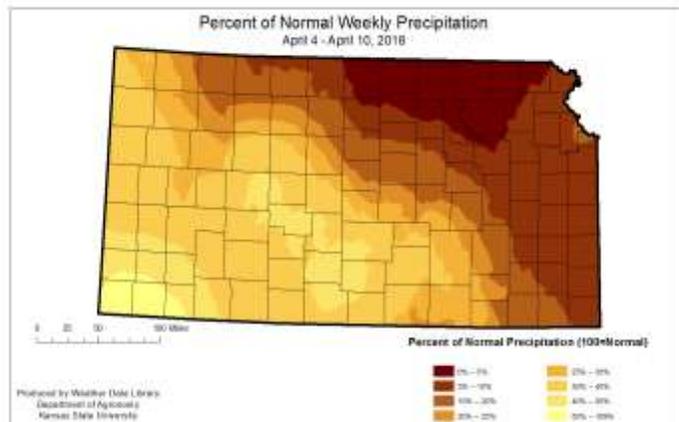
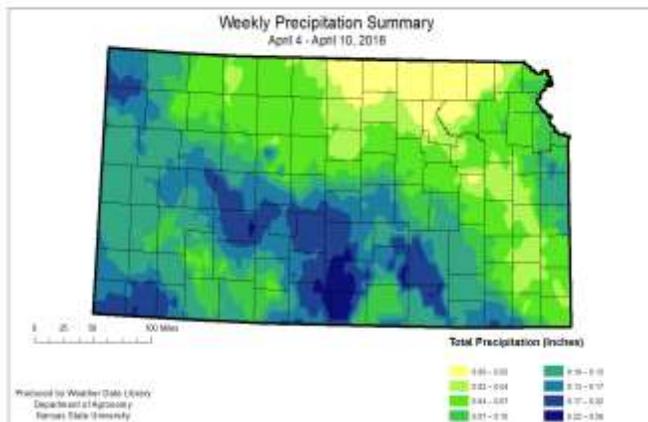
Climate Summary (Precipitation and Temperature)

Precipitation Week of April 4-10: The greatest precipitation was reported in the areas with the most extreme drought conditions – Southwest and South Central Climate Divisions of Kansas. Unfortunately, precipitation was still much lower than normal. The Southwest Division averaged 0.12 inches, or 35 percent of normal. The South Central Division averaged 0.20 inches or 36 percent of normal. Statewide average precipitation was just 0.09 inches or 19 percent of normal. The highest precipitation total for a National Weather Service Coop station was 0.90 inches at Augusta in Butler County, in the South Central Division. The highest total for a Community Collaborative Rain Hail and Snow (CoCoRaHS) station was 0.42 inches at Hugoton 0.6 NNW, Stevens County, in the Southwest Division. For the Kansas Mesonet stations, the greatest total was 0.35 inches at Hodgeman. Other stations with three tens of an inch or more included Richfield, Lake City and St. John. Unfortunately, the ET values for the western stations were also high, leaving effective moisture deficits of -0.60 to -0.90 inches for the week.

Precipitation summary is provided in the table and maps below from the KSU Weather Library. In addition, weekly maps of precipitation information can be accessed at <http://climate.k-state.edu/maps/weekly/>.

Kansas Climate Division Precipitation Summary (inches)												
Climate Division	April 4-10, 2018			January 1-April 10, 2018			April 1, 2017- April 10, 2018			Sept. 1, 2017- April 10, 2018		
	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	0.04	-0.37	9	1.05	-1.83	36	0.04	-0.54	6	4.72	-2.63	62
West Central	0.10	-0.30	25	1.14	-1.92	37	0.10	-0.46	17	5.76	-1.77	76
Southwest	0.12	-0.23	35	0.66	-2.22	22	0.12	-0.38	24	4.32	-3.02	60
North Central	0.02	-0.52	3	1.57	-2.69	37	0.03	-0.74	3	6.78	-4.21	61
Central	0.14	-0.42	26	1.77	-2.99	38	0.15	-0.66	19	6.60	-4.98	58
South Central	0.20	-0.36	36	2.25	-3.18	40	0.20	-0.61	25	7.88	-5.40	58
Northeast	0.02	-0.67	3	2.24	-2.94	42	0.24	-0.73	24	6.94	-7.58	47
East Central	0.04	-0.69	5	3.33	-2.63	54	0.54	-0.50	54	8.91	-7.36	53
Southeast	0.12	-0.62	17	4.35	-2.71	60	0.16	-0.90	16	11.42	-7.73	59
STATE	0.09	-0.46	19	2.05	-2.58	40	0.17	-0.61	21	7.08	-4.94	59

Below are the April precipitation summary percent of normal precipitation and the departure from normal precipitation for the first two weeks of April. (Maps based data from the Cooperative Observer and Kansas Mesonet, provided by KSU Weather Data Library.)



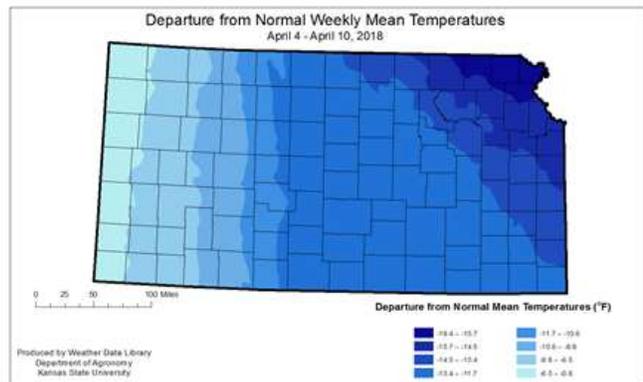
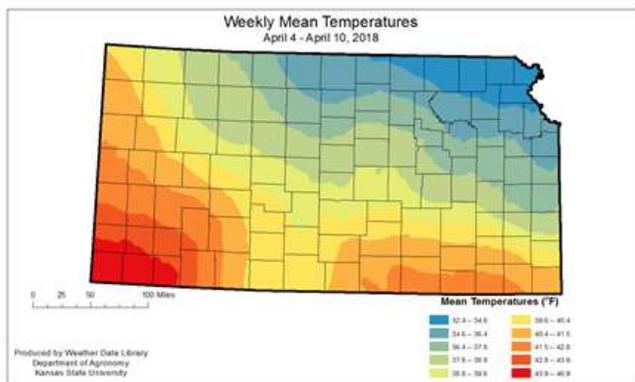
Precipitation maps are also available from the High Plains Regional Climate Center at various time intervals. <http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps>.

Temperature Week of April 4-10: As the vigorous cold air that arrived over the weekend persisted through the beginning of the week, temperatures were cooler than normal in all divisions. The statewide average temperature was 38.7 °F, or 11.7 degrees cooler than normal. The Northeast Division had the greatest departure from normal with an average of 33.5 °F, or 16.9 degrees cooler than normal. The Southwest Division came closest to normal, with an average of 43.7 °F or 7.4 degrees cooler than normal. The highest maximum temperature was 78 °F at Russell 1E, Russell County, on the 10th. The lowest minimum temperature was 4 °F at both Alton 6ESE, Osborne County, and Atwood 2SW, Rawlins County, on the 7th.

Climate Division	Kansas Climate Division Temperature Summary (°F)							
	April 4-10, 2018							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	55.9	23.2	39.5	-7.5	72	5	4	7
West Central	56.0	23.5	39.7	-8.4	76	6	10	7
Southwest	60.1	27.3	43.7	-7.0	78	6	14	7
North Central	50.8	20.5	35.6	-14.2	77	10	8	7
Central	54.3	23.0	38.6	-12.3	79	10	8	7
South Central	54.7	26.4	40.6	-11.8	75	6	14	4
Northeast	45.7	21.3	33.5	-16.9	71	6	12	7
East Central	48.9	24.3	36.6	-14.5	74	6	15	4
Southeast	53.6	27.3	40.5	-12.4	72	6	18	9
STATE	53.3	24.1	38.7	-11.7	79	10th	4	7th

Data Source: KSU Weather Library

Below are the weekly mean temperatures and the departure from normal temperatures for the time period. (Maps based data from the Cooperative Observer and Kansas Mesonet, provided by on KSU Weather Data Library.)



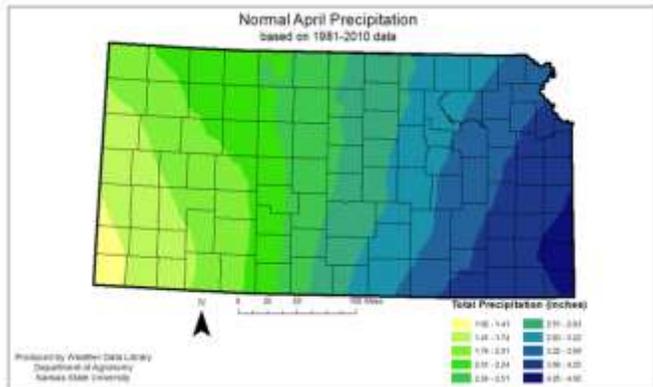
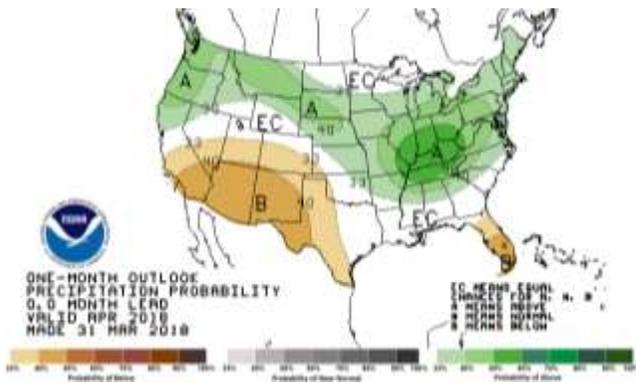
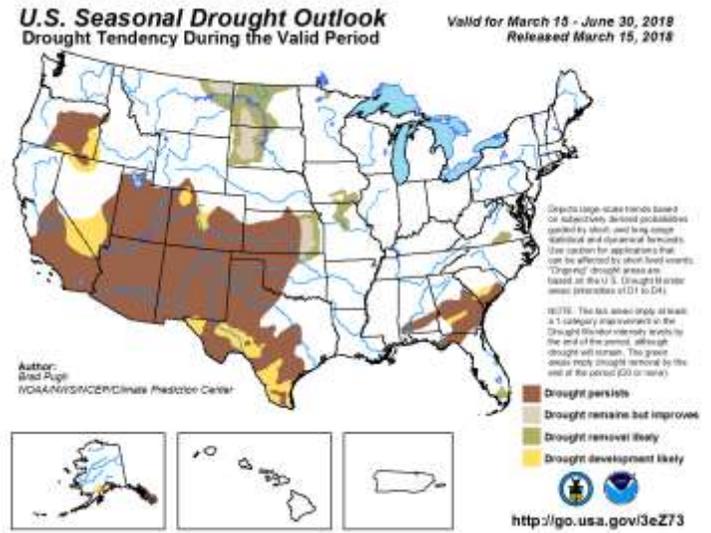
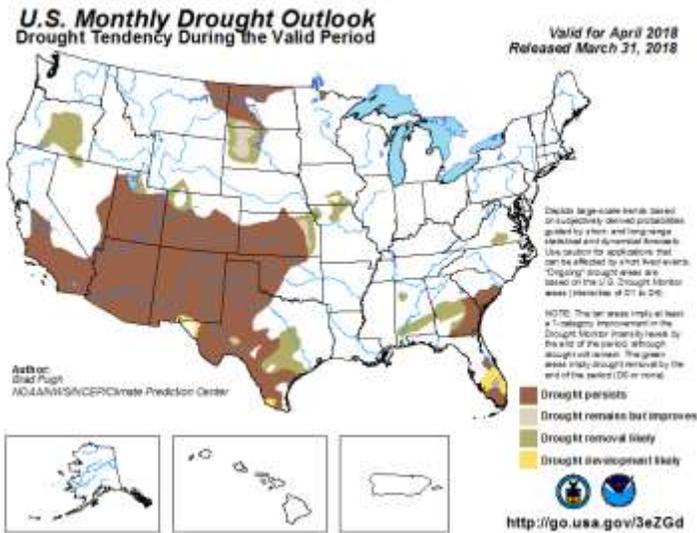
Temperature maps are also available from the High Plains Regional Climate Center at various time intervals. <http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps>

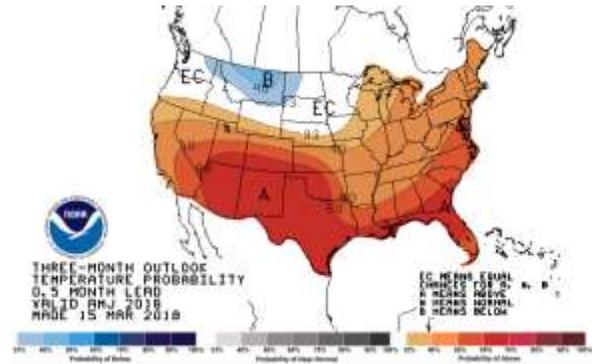
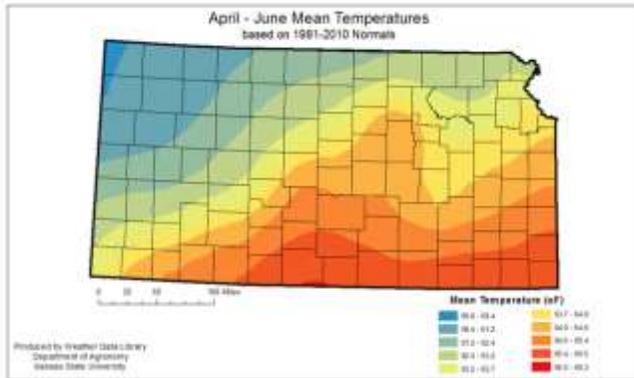
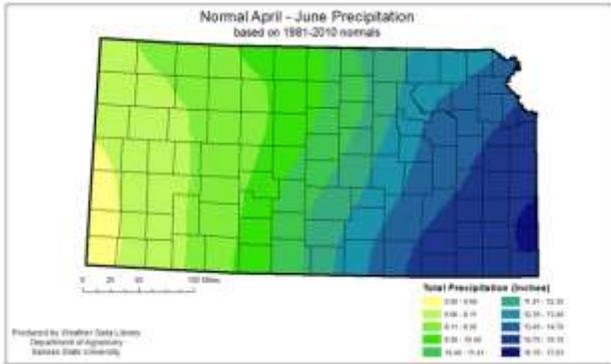
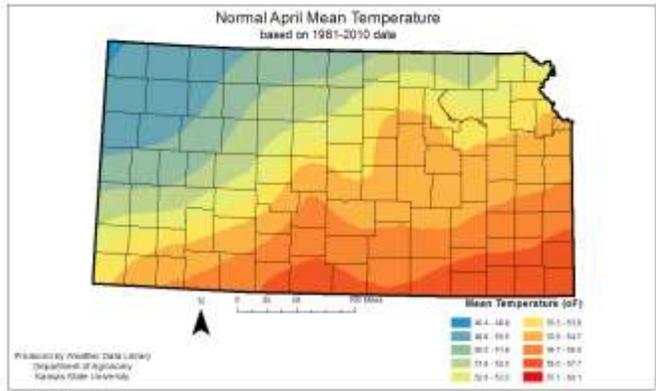
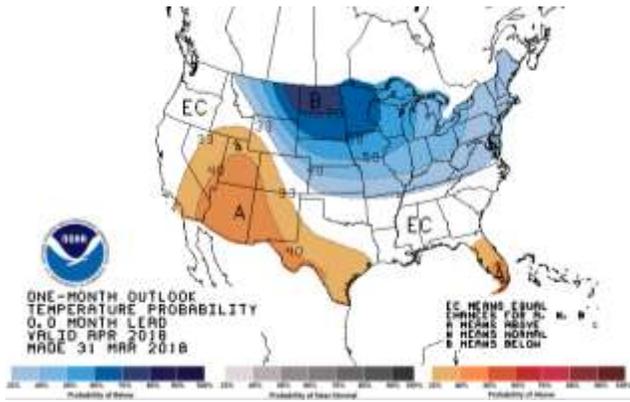
Future Outlook

The Monthly Drought Outlook indicates drought conditions to remain in southern, central and western Kansas. Improvement of drought conditions is possible in the east and northeast portions of Kansas. The April outlook has a slight chance for wetter than normal conditions across the eastern portions of the state, with drier than normal conditions in the southwest corner of the state. The temperature outlook is for cooler than normal temperatures statewide. Unless April moisture is significant, even that combination is unlikely to result in significant improvement of the drought conditions

Seasonal Outlook (3-month) favors continued drought in south central, central and western Kansas with the east improving. For the March 15-June 30 time period probability favors below normal precipitation and above normal temperatures for western parts of the state. The remaining areas have equal chances of below or above normal precipitation and temperatures for the period.

The individual temperature and precipitation outlooks are provided below for the one and three month periods.





Additional outlooks for various 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.

Known issues:

Stage II water restrictions, remain in place under Resolution 03-16 are in place for the **City of Russell**, Russell County water customers as of April 16, 2018 (www.russellcity.org/148/Current-Water-Status). The water restrictions include a prohibition on outdoor watering from 10:00 am to 7:00 pm. It also prohibits the waste of water.

Stage II water restrictions have been in place for the **City of Victoria**, Ellis County since June 2017. No lawn watering or filling of private swimming pools is allowed. Watering of trees, flowers and gardens allowed, but not between 10 am and 5 pm. (April 16, 2018, <http://victoriaks.com/utilities.htm>.)

Water Emergency currently in place for **Medicine Lodge**, Barber County. Citizens may water before 10 am and after 9 pm.(<https://medicinelodge.kansas.gov/> April 16, 2018)

Surface Water Supply Conditions

Kansas River basin: Inflow to Tuttle Creek, Perry, Milford, and Clinton reservoirs continue to decline in April. However, storage in the basin has not been significantly impacted from the abnormally dry conditions in recent months. Clinton maintained a full pool and the other three reservoirs were below the top of multipurpose elevation due to planned seasonal drawdowns. The lower seasonal elevations may extend longer than planned if inflow conditions don't improve. Flow in the Kansas River remained less than half of historic median values with the majority of the flow from reservoir releases, primarily Tuttle Creek, which is experiencing a slight decline in elevation.

Marais des Cygnes basin: Melvern, Pomona, and Hillsdale reservoirs are all set to minimum gate settings. Melvern and Pomona have not refilled from their lower winter target elevation and are experiencing a slight declining trend in April. Reservoir releases have not been necessary to supplement flow in the Marais des Cygnes River.

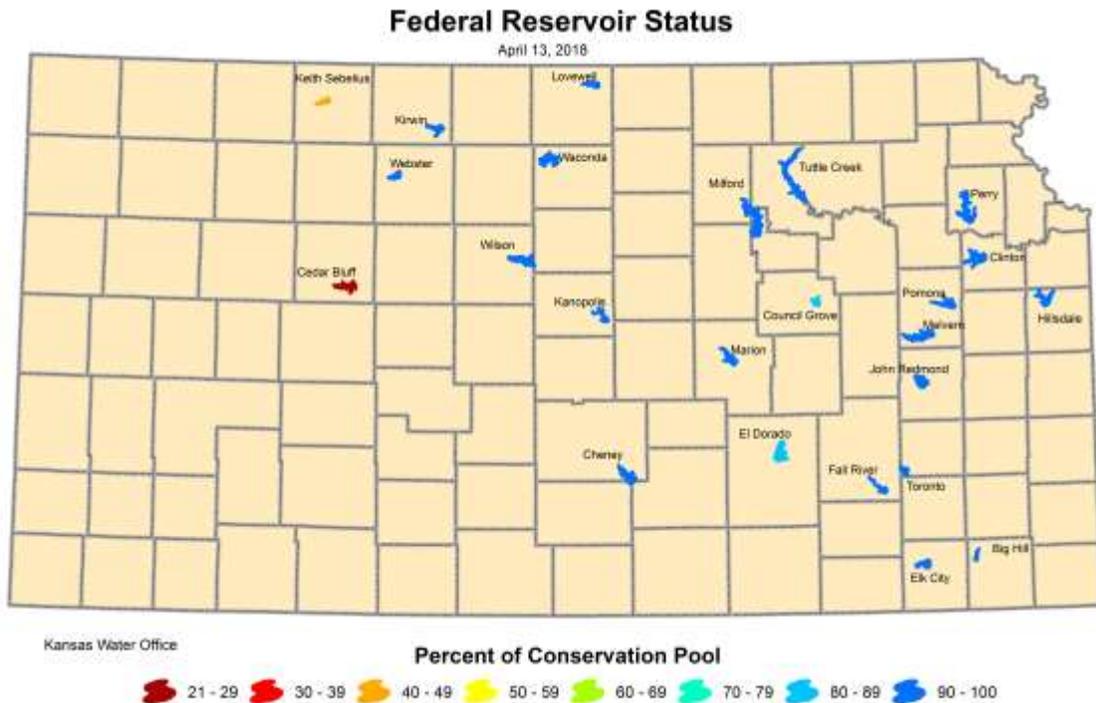
Cottonwood/Neosho basin: Inflows to Marion, Council Grove, and John Redmond reservoirs are generally low and streamflow is declining throughout the system. Conservation storage is full in John Redmond but steadily declined in Marion and Council Grove. Releases are necessary to maintain sufficient streamflow and releases from John Redmond are on-going to meet the needs of Wolf Creek power plant.

Verdigris basin: Toronto, Fall River, and Big Hill reservoirs are at or near conservation pool levels; Elk City Reservoir is maintaining above normal pool. Reservoir releases are necessary to supplement low flow conditions of the Fall and Verdigris Rivers but reservoir storage is healthy.

Saline basin: The elevation at Wilson Lake is being maintained slightly above normal pool and streamflow conditions are maintaining near median values.

Smoky Hill basin: The middle Smoky Hill basin maintained streamflow but has not experience any significant runoff events. Inflow to Kanopolis Lake remained slightly below median historic values and a healthy rain and runoff event will be needed to refill storage to the summer target elevation of 1,467.7, 4.7 feet above the top of Multipurpose. The target flow of 20 cfs at the Mentor gage has been maintained with minimal releases from Kanopolis, allowing a very gradual rise in elevation in April.

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		04/13/18		
Norton ¹	2304.3	2292.33	-11.97	41.6
Harlan County, NE	1945.73	1940.28	-5.45	78.3
Lovewell ¹	1582.6	1581.64	-0.96	92.3
Milford ¹	1144.4	1141.95	-2.45	90.2
Cedar Bluff	2144	2117.32	-26.68	29.3
Kanopolis ¹	1463	1462.78	-0.22	98.7
Wilson ¹	1516	1516.22	0.22	100.0
Webster ¹	1892.5	1893.78	1.33	100.0
Kirwin ¹	1729.3	1729.51	0.26	100.0
Waconda ¹	1455.6	1454.71	-0.89	94.7
Tuttle Creek ¹	1075	1074.59	-0.41	98.3
Perry ¹	891.5	889.42	-2.08	89.7
Clinton ¹	875.5	875.89	0.39	100.0
Melvorn ¹	1036	1034.99	-1.01	95.4
Pomona ¹	974	973.04	-0.96	93.2
Hillsdale ¹	917	917.03	0.03	100.0
Arkansas River Basin		04/12/18		
Cheney	1421.6	1420.99	-0.61	96.0
El Dorado	1339	1334.73	-4.27	81.0
Toronto ¹	901.5	902.97	1.47	100.0
Fall River ¹	948.5	948.48	-0.02	100.0
Elk City ¹	796	796.88	0.88	100.0
Big Hill	858	858.03	0.03	100.0
Council Grove ¹	1274	1271.84	-2.16	87.0
Marion ¹	1350.5	1348.50	-1.20	91.0
John Redmond ¹	1039	1041.43	0.43	100.0

¹Lake 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.

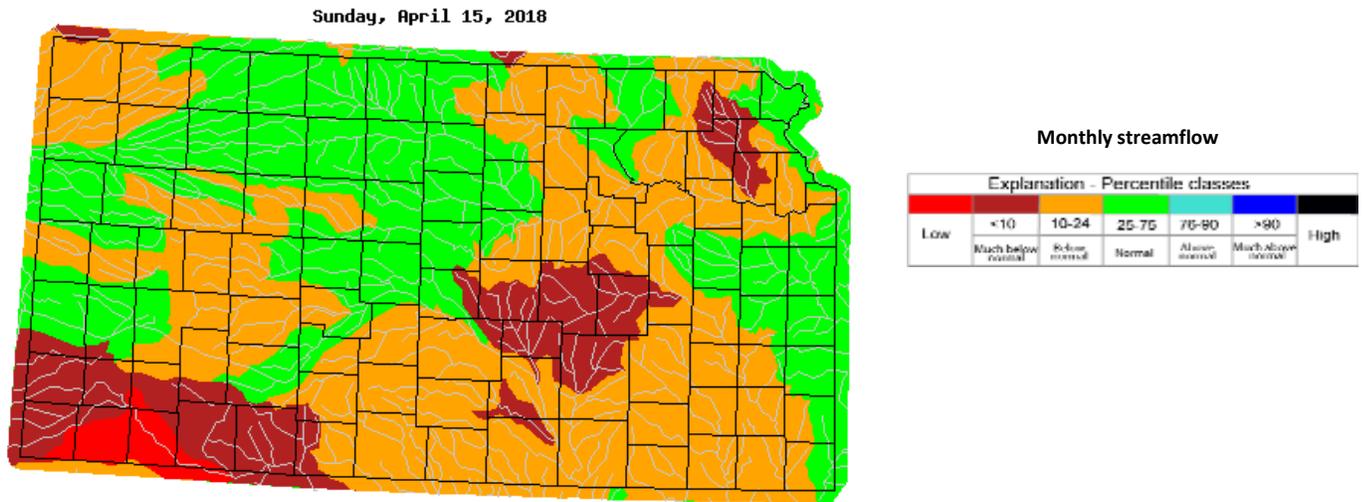
Harmful Blue-Green Algal Blooms (lake water safety)

KDHE issues two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. 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. Warning that conditions are unsafe and water contact should not occur include that no swimming, wading, skiing or consumption of the water should occur. Spring evaluation resumed in March. There are currently no warnings and watches in effect.

Streamflow Conditions

WaterWatch summarizes streamflow conditions in a region (state or hydrologic unit) in terms of the long-term typical condition at stream gages in the region.

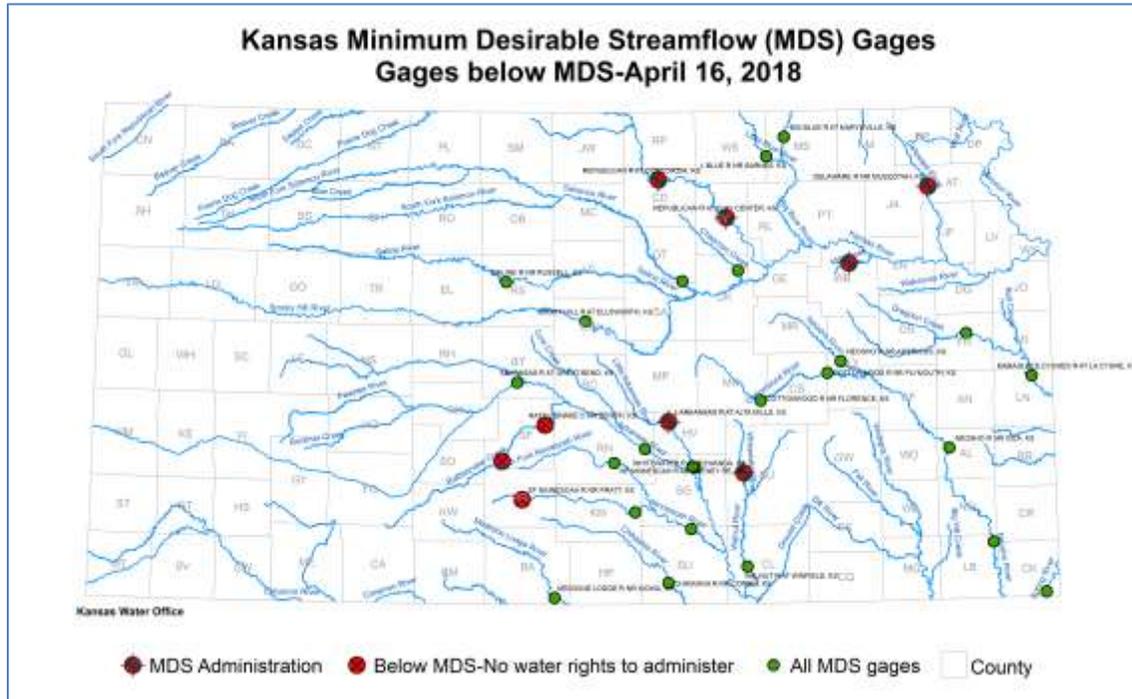
7-day average stream flow compared to historical is reflected in the map below.



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 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. MDS administration is occurring at numerous locations. Please see table below of current administration.



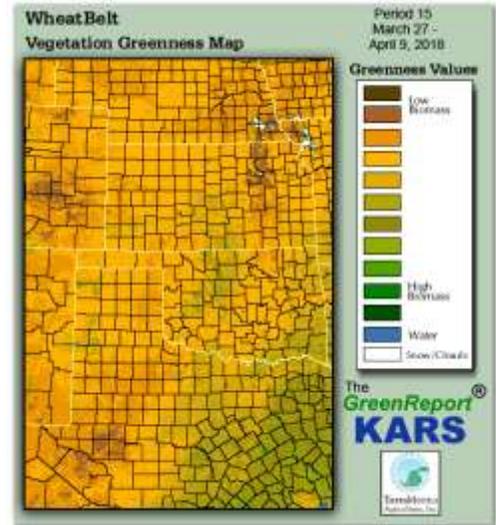
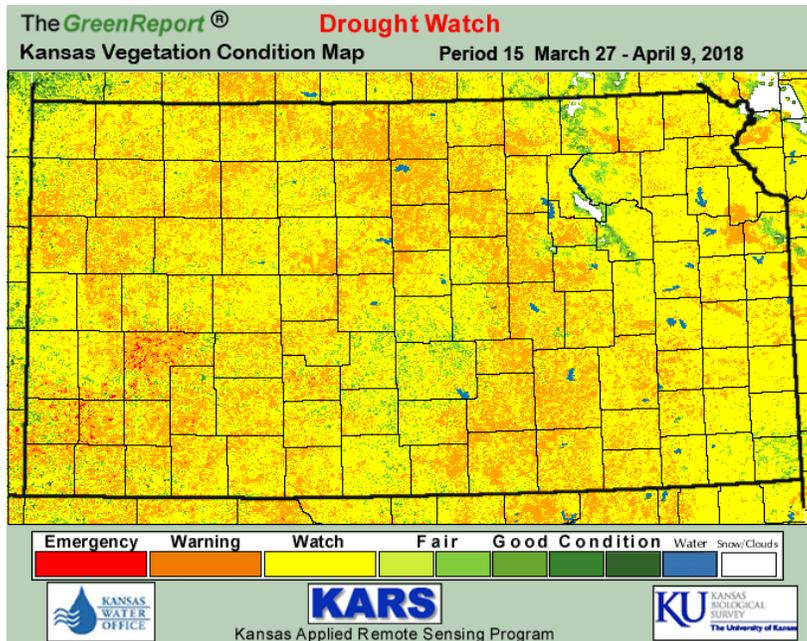
The table below provides a snapshot of conditions for streams of interest to the Kansas Department of Agriculture, Division of Water Resources. There are locations where flows are below MDS, but administration is not in effect since there are no junior diversion above each gage and others where the below MDS flows will be of sufficient number of days to require administration soon.

Streamflows as of April 16, 2018			
Gaging Station	Current Flow	Apr MDS	Comment
Republican River at Concordia	100	150	Admin began April 13, 2018
Republican River at Clay Center	184	250	Admin began April 13, 2018
Little Blue River near Barnes	165	150	
Mill Creek near Paxico	8	25	Admin began April 12, 2018
Delaware River near Muscotah	15	20	Admin began March 23, 2018
Rattlesnake Creek near Macksville	1	10	No surface water diversions junior to MDS above gage
Rattlesnake Creek near Zenith	8	15	No surface water diversions junior to MDS above gage
Little Arkansas River at Alta Mills	4	8	MDS admin began Aug 10, 2017
South Fork Ninescaw River near Pratt	6	8	No surface water diversions junior to MDS above gage
Whitewater River near Towanda	12	20	Admin began April 12, 2018
Medicine Lodge River near Kiowa	59	60	

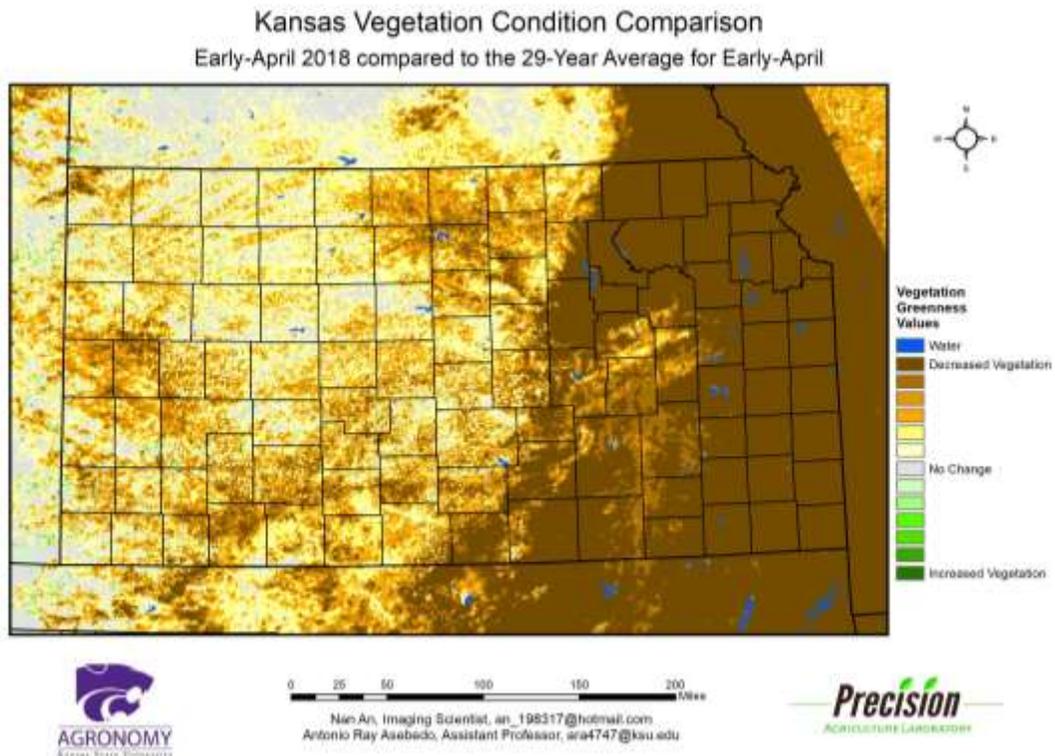
Soil, Crop and Vegetation

Kansas Vegetative Conditions

The Kansas Vegetative Condition map provides current conditions. It is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. Many of the areas shown as orange (warning) are wheat areas, indicating lack of growth of the wheat. The second map provides an overview of the greenness to better identify wheat condition..



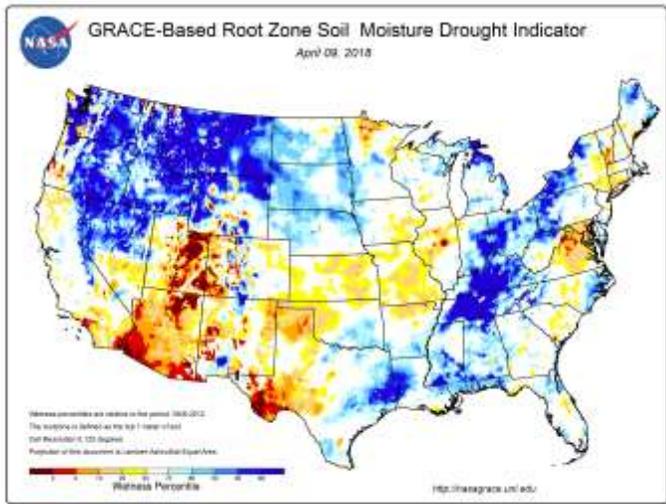
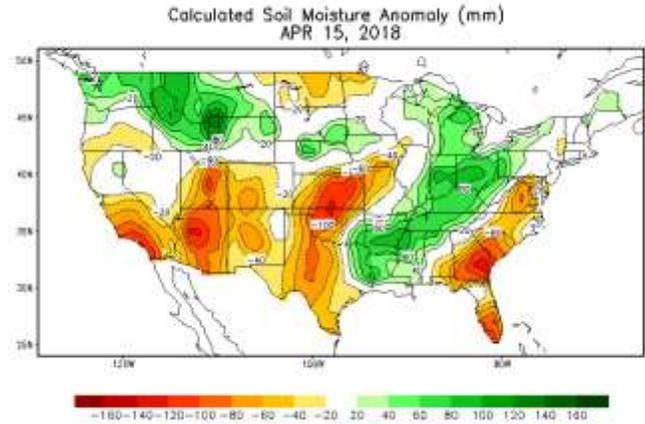
The KSU Department of Agronomy produces a comparison map, comparing present year with historical vegetative conditions .



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. The soil anomaly is provided below indicates deficit soil moisture for most of Kansas.

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



NASA generates soil moisture drought indicators each week using GRACE satellite data integrated with other observations. Indicators describe wet or dry conditions as a percentile of probability of occurrence within the period of record (1948-present).

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.

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, and livestock feed and water supplies. The Kansas report by USDA's National Agricultural Statistics Service for the state as a whole for the week ending April 14, 2018 indicates topsoil moisture supplies 36 percent very short, 36 short, 28 adequate, and 0 surplus. Subsoil moisture supplies rated 31 percent very short, 39 short, 30 adequate, and 0 surplus.

Field Crops Report: Winter wheat condition rated 14 percent very poor, 32 poor, 42 fair, 11 good, and 1 excellent.

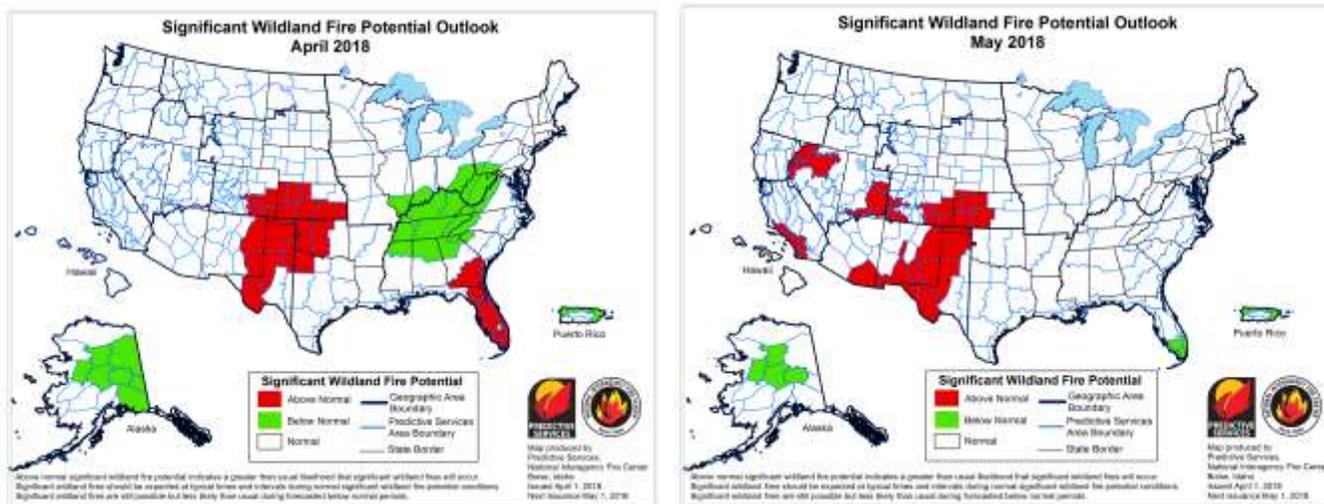


Based on the Palmer Drought Index, the Crop Moisture Index (CMI) uses a meteorological approach to monitor week-to-week crop conditions. It was developed by Palmer (1968) from procedures within the calculation of the PDSI. The CMI was designed to evaluate short-term moisture conditions across major crop-producing 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](#).

Fire

April conditions resulted in numerous wildfires and Red Flag warnings alerting citizens to potential increases in wildfire activity due to ideal conditions for wildland fire combustion and rapid spread. Dry conditions increase the potential for wildfire. According to the National Interagency Fire Center, wildfire activity is likely to continue in western and southern Kansas in April and in the west into May. Periods of concern will be wind events coupled with low humidity that impact fire activity. Kansas Forest Service provides a grassland fire danger index at: http://www.kansasforests.org/fire_management/grasslandfireindex.html.

Significant Wildland Fire Potential Outlook is issued monthly for the United States, https://www.predictiveservices.nifc.gov/outlooks/monthly_seasonal_outlook.pdf. These indicate portions of Kansas will remain above normal in wildfire activity in April and May 2018.



Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report are 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 KWO web site, <http://www.kwo.ks.gov/reports2/climate-and-drought-monitoring-response>, 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 (<https://hprcc.unl.edu/>) 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.ks.gov.

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://vegdiri.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, 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 KWO, provide guidance regarding drought preparedness and response. These are available at <http://www.kwo.ks.gov/reports2/climate-and-drought-monitoring-response>.

USDA Drought Programs and Assistance website (<https://www.usda.gov/topics/disaster/drought/usda-drought-programs-and-assistance>) listing the various USDA programs and agencies to assist with drought issues.

The National Interagency Coordination Center in Boise, Idaho, produces wildfire potential outlook maps monthly. (<https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm>)

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.



KANSAS CLIMATE and DROUGHT UPDATE

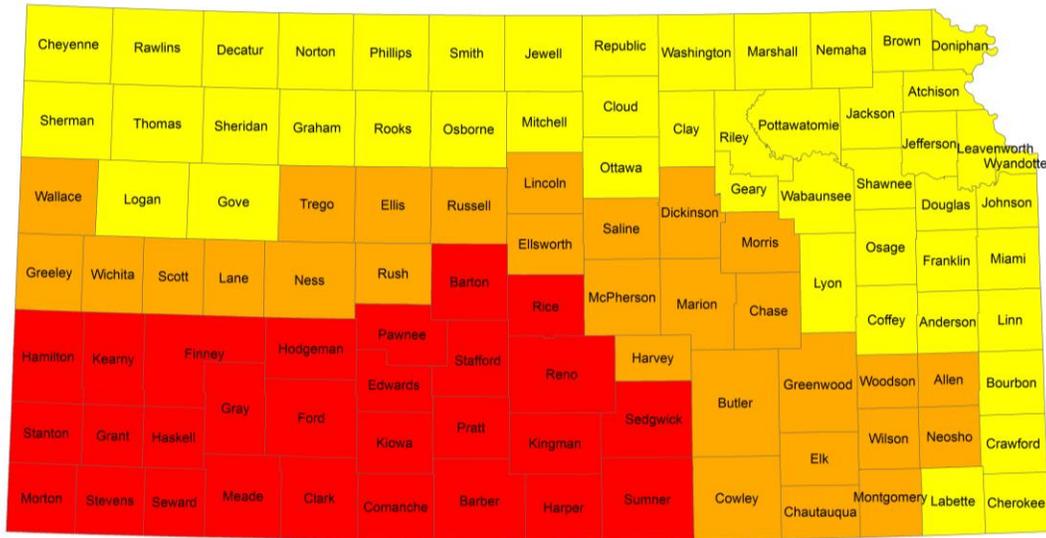
End-April 2018 Summary

General Overview

- U.S. Drought Monitor exceptional drought expanded to include all or portions of 11 southwestern counties, now covering 7% of Kansas. this brings the area of Kansas in extreme drought or worse to over 27%.
- Drought Declarations for Kansas counties remain in effect under Executive Order 18-11, issued March 13, 2018 includes all 105 counties placing 28 counties in emergency status, 29 into a warning status and 48 into a watch status.
- USDA Drought Disaster Designations as of April 25, 2018 have been made for 48 primary counties and 20 contiguous counties in Kansas.
- USDA-FSA has approved CRP acreages some counties for grazing or haying and grazing. FSA must receive a written request to start the approval process. Twenty-eight counties are approved for emergency haying and grazing. Five counties are approved for emergency grazing only.
- Administration was effective April 13, 2018, on the Republican River from the Clay Center gage to state line, covering 225 water rights.
- Administration was effective on Mill Creek above the gage near Paxico, April 12, 2018 covering 14 water rights.
- Administration was effective on the Whitewater River above the gage near Towanda, April 12, 2018 covering 11 water rights
- Administration was put in effect March 23, 2018 for 40 water rights above the Muscotah gage on the Delaware River.
- Water Rights above the USGS gage on the Little Arkansas River at Alta Mills have been administrated under Minimum Desirable Streamflow (MDS) since August 10, 2017.
- As of April 24, Kansas crops located in drought: 85% of hay production; 86% of winter wheat (nationally 37%); 81% of corn and 87% soybeans
- As of April 24, 89% of cattle in Kansas are located in drought (15% exceptional, 26% extreme, 29% severe and 19% moderate)

March 13, 2018 Governor Orders Drought Declaration for all Kansas Counties - Executive Order 18-11
 Governor Jeff Colyer, MD issued Drought Declarations for Kansas counties with Executive Order 18-11. The declaration includes all 105 counties placing 28 counties in emergency status, 29 into a warning status and 48 into a watch status.

Kansas Drought Declarations March 13, 2018



Kansas Drought Stage
 Watch Warning Emergency



Drought Watch counties: Anderson, Atchison, Bourbon, Brown, Cherokee, Cheyenne, Clay, Cloud, Coffey, Crawford, Decatur, Doniphan, Douglas, Franklin, Geary, Gove, Graham, Jackson, Jefferson, Jewell, Johnson, Labette, Leavenworth, Linn, Logan, Lyon, Marshall, Miami, Mitchell, Nemaha, Norton, Osage, Osborne, Ottawa, Phillips, Pottawatomie, Rawlins, Republic, Riley, Rooks, Shawnee, Sheridan, Sherman, Smith, Thomas, Wabaunsee, Washington, Wyandotte

Drought Warning counties: Allen, Butler, Chautauqua, Chase, Cowley, Dickinson, Elk, Ellis, Ellsworth, Greeley, Greenwood, Harvey, Lane, Lincoln, Marion, McPherson, Montgomery, Morris, Neosho, Ness, Rush, Russell, Saline, Scott, Trego, Wallace, Wichita, Wilson, Woodson

Drought Emergency counties: Barber, Barton, Clark, Comanche, Edwards, Finney, Ford, Grant, Gray, Hamilton, Harper, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Meade, Morton, Pawnee, Pratt, Reno, Rice, Sedgwick, Seward, Stafford, Stanton, Stevens, Sumner

General Conditions

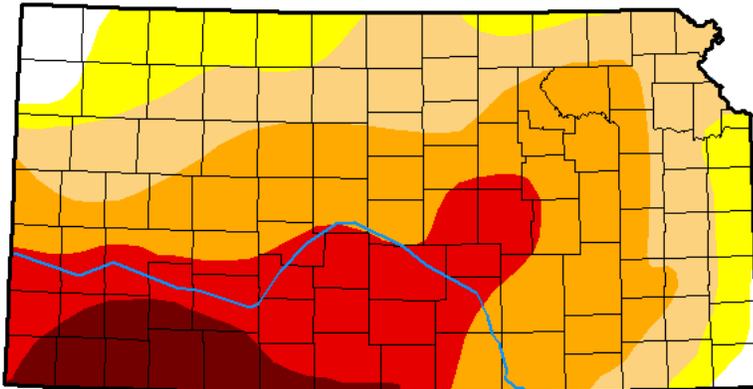
Only three percent (%), the northwest and southeast corners of Kansas, is not affected by dry or drought conditions at the end of April according to the U.S. Drought Monitor. Despite some widespread rains, the state drought conditions continue in most of Kansas. The affected area and severity has not deteriorated further the last couple of weeks. Exceptional drought conditions now cover just over 7 percent of the state, with extreme drought covering an additional 20% of the state. Severe drought has expanded to nearly 60 percent of the state during April, while moderate drought covers an additional 25% of the state.

U.S. Drought Monitor Kansas

April 24, 2018
(Released Thursday, Apr. 26, 2018)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	3.10	96.90	84.85	59.47	27.16	7.20
Last Week <i>04-17-2018</i>	2.00	98.00	83.37	59.47	27.37	7.20
3 Months Ago <i>01-23-2018</i>	0.00	100.00	52.91	19.19	4.08	0.00
Start of Calendar Year <i>01-02-2018</i>	0.00	100.00	32.70	8.75	0.00	0.00
Start of Water Year <i>09-26-2017</i>	59.89	40.11	10.08	1.35	0.00	0.00
One Year Ago <i>04-25-2017</i>	88.39	11.61	0.00	0.00	0.00	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.

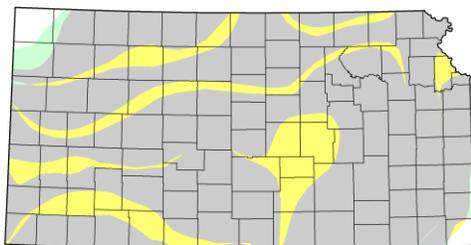
Author:

Brad Rippey
U.S. Department of Agriculture



<http://droughtmonitor.unl.edu/>

U.S. Drought Monitor Class Change - Kansas
1 Month



April 24, 2018
compared to
March 27, 2018

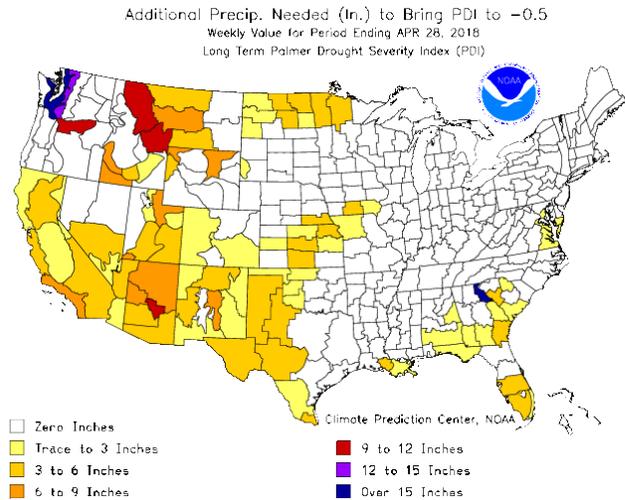
<http://droughtmonitor.unl.edu>

More information on the U.S. Drought Monitor categories can be found at

<http://droughtmonitor.unl.edu/AboutUs/ClassificationScheme.aspx>.

Palmer Drought Severity Index (PDSI) - The Palmer Drought Severity Index is an indicator of relative dryness or wetness and is one factor used the U.S. Drought Monitor. The additional precipitation map indicates the inches of precipitation needed to be out of drought.

More information on the PDSI can be found at http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml



Long-term PDI				
Precipitation needed to remove drought for week ending on date				
Climate Division	Apr 7	Apr 14	Apr 21	Apr 28
Northwest	-	-	-	-
North Central	2.69	3.10	2.64	2.96
Northeast	4.90	5.53	5.42	5.60
West Central	-	0.65	-	0.55
Central	5.27	5.72	4.86	5.16
East Central	0.58	1.16	1.08	1.26
Southwest	Unknown	unknown	unknown	unknown
South Central	4.67	5.09	3.91	3.90
Southeast	-	0.66	-	-

Federal Disaster Drought Declarations 2018

Presidential Federal Disasters

Presidential major disaster declarations must be requested of the President by a governor. A Presidential disaster declaration allows county governments to apply for Public Assistance funds for emergency work and the repair or replacement of disaster-damaged facilities. It also activates the Hazard Mitigation Grant Program statewide for actions taken to prevent or reduce long term risk to life and property from natural hazards.

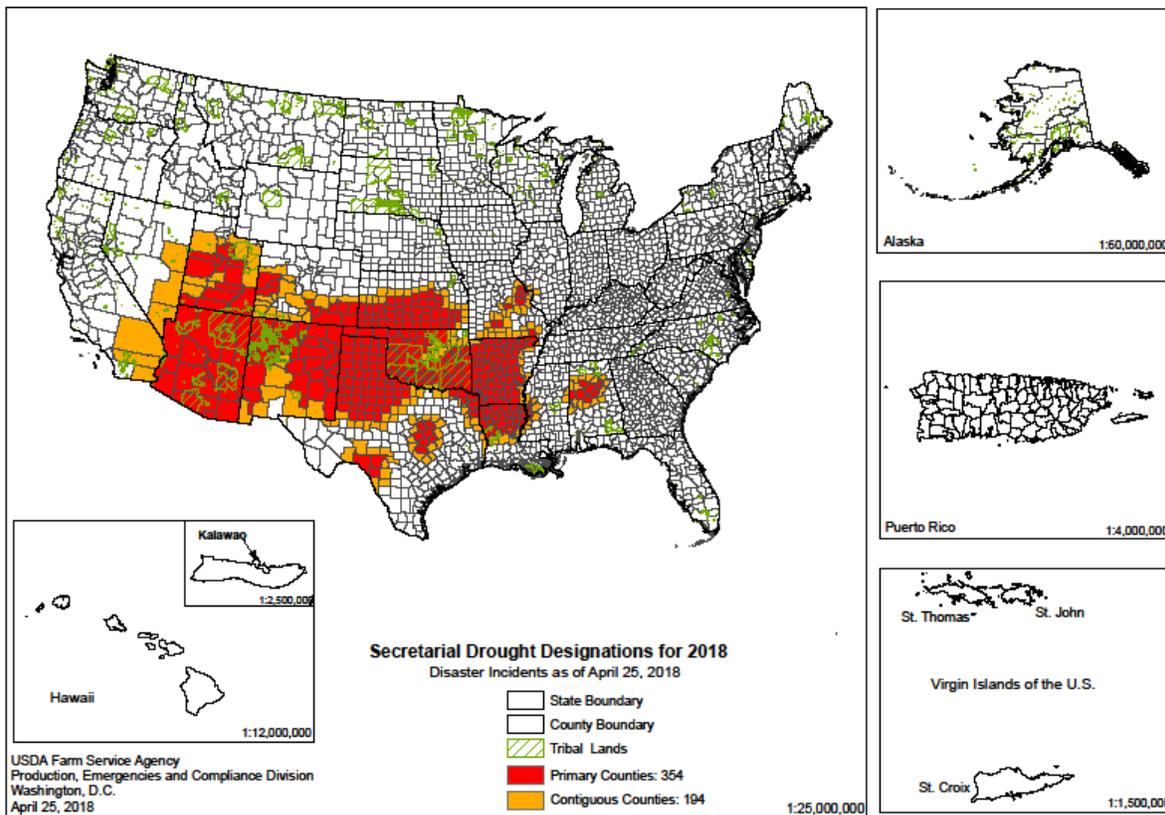
U. S. Department of Agriculture Drought Disaster

USDA Secretary makes agricultural disaster designations based on crop losses in a designated county. Disaster designations make emergency (EM) loans available to producers suffering losses in those counties and in counties that are contiguous to a designated county. In addition to EM loan eligibility, other emergency assistance programs, such as Farm Service Agency (FSA) disaster assistance programs, have historically used disaster designations as an eligibility trigger.

Designation may be through set process or using Fast Track Secretarial disaster designations for severe drought. Fast Track for drought provides for a nearly automatic designation when, during the growing season, any portion of a county meets the D2 (Severe Drought) drought intensity value for eight consecutive weeks or a higher drought intensity value for any length of time as reported in the U.S. Drought Monitor.

USDA drought disasters have been declared in 2018 for Kansas. Designations are for 48 primary counties and 20 contiguous counties. Primary counties include Allen, Barber, Barton, Butler, Chase, Chautauqua, Clark, Comanche, Cowley, Dickinson, Edwards, Elk, Ellsworth, Finney, Ford, Grant, Gray, Greenwood, Hamilton, Harper, Harvey, Haskell, Hodgeman, Kearny, Kingman, Kiowa, Marion, McPherson, Meade, Montgomery, Morris, Morton, Neosho, Ness, Pawnee, Pratt, Reno, Rice, Rush, Saline, Sedgewick, Seward, Stafford, Stanton, Stevens, Sumner, Wilson and Woodson. Contiguous counties are Anderson, Bourbon, Clay, Coffey, Crawford, Ellis, Geary, Gove, Greeley, Labette, Lane, Lincoln, Linn, Lyon, Ottawa, Russell, Scott, Trego, Wabaunsee and Wichita.

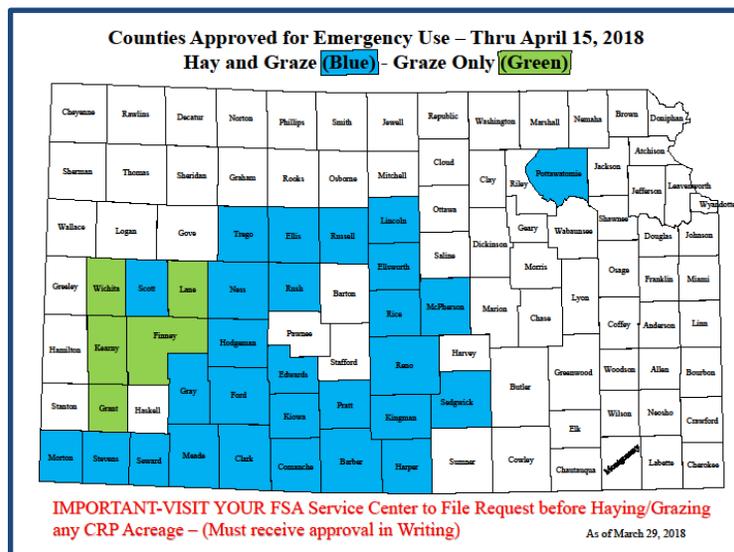
2018 Secretarial Drought Designations - All Drought



Haying and grazing of Conservation Reserve Program (CRP) acres is authorized under certain conditions to improve the quality and performance of the CRP cover or to provide emergency relief to livestock producers due to certain natural disasters. There are two types of haying and grazing authorization: managed and emergency.

USDA-FSA has approved emergency haying and grazing on CRP acreages in some counties in Kansas (March 29, 2018). FSA must receive a written request to start the approval process. Twenty-eight counties are approved for emergency haying and grazing. Five counties are approved for emergency grazing only.

A fact sheet is available at https://www.fsa.usda.gov/Assets/USDA-FSA-Public/usdfiles/FactSheets/2017/emergency_haying_and_grazing_oct2017.pdf



Climate Summary - Precipitation

While precipitation began to fall towards the end of the month, April continued the pattern of below normal precipitation. The state-wide average precipitation was 1.19 inches which was just 45 percent of normal. April is one of the months with higher normal precipitation, so the deficit of -1.48 inches has had a negative impact on vegetation. The division that came closest to normal precipitation was the Southcentral Division with an average of 1.57 inches or 58 percent of normal. The Northeast Division had the greatest departure, with an average of 1.01 inches or just 31 percent of normal. The greatest monthly total for a National Weather Service Cooperative station was Augusta, Butler County with 3.29 inches. The Community Collaborative Rain, Hail and Snow network station with the greatest monthly precipitation was Winfield 5.9SW, Cowley County, with 3.06 inches. Among the Kansas Mesonet stations, the Butler County station near El Dorado had the greatest total at 2.38 inches

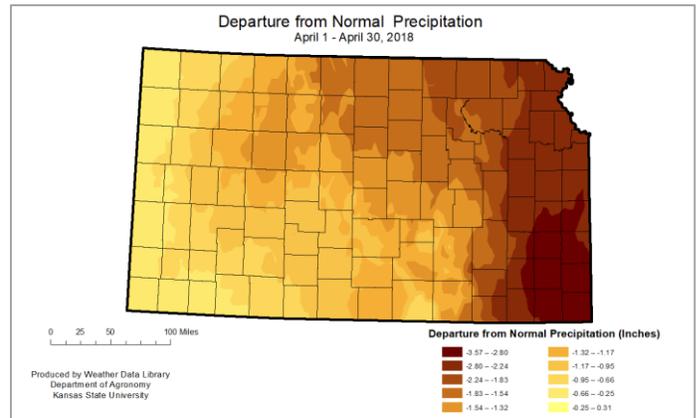
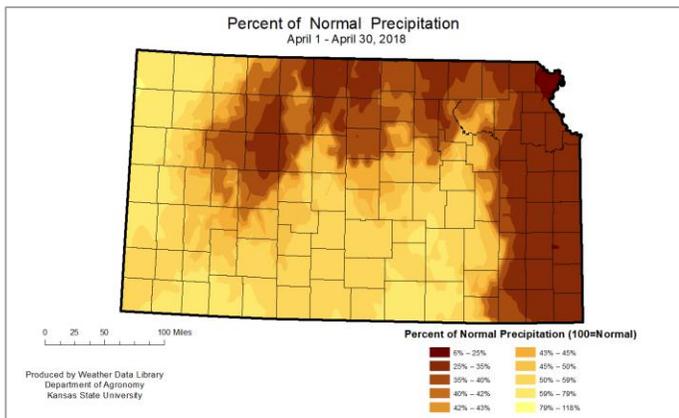
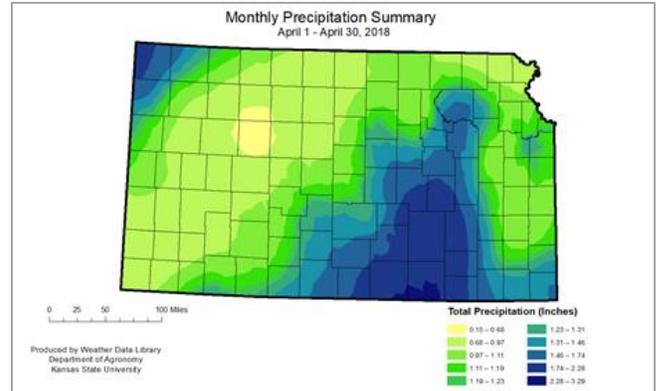
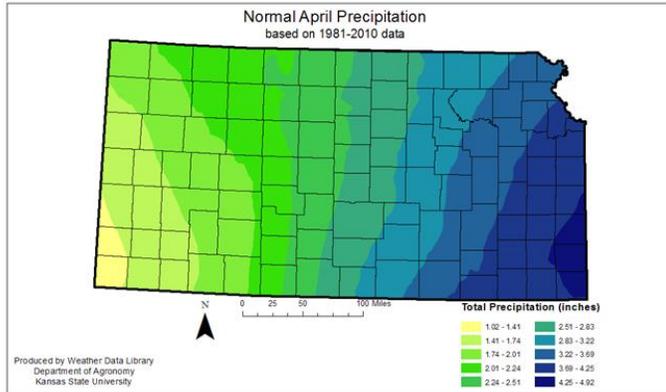
Precipitation week of April 11-17: Some snow and rain, but April 10-17 was another dry week in Kansas. The Southwest Climate Division averaged just 0.01 inches, or 2 percent of normal. The South Central Division averaged 0.03 inches or 4 percent of normal. The wettest division was the East Central, and that averaged just 0.13 inches or 16 percent of normal. Statewide average precipitation was just 0.06 inches or 9 percent of normal. The highest precipitation total for a National Weather Service Coop station was 0.81 inches at Chapman in Dickinson County. The highest total for a Community Collaborative Rain Hail and Snow (CoCoRaHS) station was 0.92 inches at Princeton 2.0 NE, Franklin County, in the East Central Division. For the Kansas Mesonet stations, the greatest total was 1.14 inches at Olathe in Johnson County.

Precipitation week of April 18-24: Most of Kansas received precipitation as rain moved across the state. The Northeast Climate Division tied with the Northwest Division for the lowest total at 0.23 inches. However, the percent of normal for the Northeast was just 30 percent, while the Northwest percent of normal was 41 percent. The southern divisions all came in at above normal for the week, with the South Central Division averaging 0.89 inches or 132 percent of normal. Statewide average precipitation was just 0.55 inches or 86 percent of normal. These totals don't include precipitation that fell on the 24th that was reported on the 25th. For the week ending on April 24th, the highest precipitation total for a National Weather Service Coop station was 2.05 inches at Arkansas City, Cowley County. The highest total for a Community Collaborative Rain Hail and Snow (CoCoRaHS) station was 2.17 inches at Winfield 5.9 SW, also in Cowley County. For the Kansas Mesonet stations, the greatest total was 2.20 inches at Butler County station near El Dorado.

Precipitation summary is provided in the table and maps below from the KSU Weather Library. In addition, weekly maps of precipitation information can be accessed at <http://climate.k-state.edu/maps/weekly/>.

Kansas Climate Division Precipitation Summary (inches)												
Climate Division	April 1-30, 2018			January 1-April 30, 2018			April 1, 2017- April 30, 2018			Sept. 1, 2017- April 30, 2018		
	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal	Actual	Depart Normal	Percent Normal
Northwest	0.67	-1.4	32	1.69	-2.68	39	0.67	-1.40	32	5.36	-3.49	61
West Central	0.81	-1.10	42	1.84	-2.57	42	0.81	-1.10	42	6.46	-2.42	73
Southwest	0.89	-0.75	54	1.44	-2.58	36	0.89	-0.75	54	5.11	-3.38	60
North Central	0.99	-1.53	39	2.56	-3.45	43	0.99	-1.53	39	7.76	-4.98	61
Central	1.21	-1.45	45	2.82	-3.79	43	1.21	-1.45	45	7.65	-5.77	57
South Central	1.57	-1.13	58	3.57	-3.75	49	1.57	-1.13	58	9.21	-5.96	61
Northeast	1.01	-2.24	31	3.16	-4.30	42	1.01	-2.24	31	7.87	-8.92	47
East Central	1.63	-1.93	46	4.50	-3.98	53	1.63	-1.93	46	10.08	-8.71	54
Southeast	1.66	-2.21	43	5.80	-4.07	59	1.66	-2.21	43	12.87	-9.09	59
STATE	1.19	-1.48	45	3.07	-3.45	47	1.19	-1.48	45	8.11	-5.79	58

Below are the precipitation summary and the normal precipitation for April and comparisons to normal from Kansas State University Department of Agronomy. (Maps based data from the Cooperative Observer and Kansas Mesonet, provided by KSU Weather Data Library.)



Precipitation maps are also available from the High Plains Regional Climate Center at various time intervals.
<http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps>.

Climate Summary - Temperature

Month of April: April 2018 set a new record as the coldest since 1895. The state-wide average temperature for the month was 46.7 °F. This was 6.5 degrees cooler than normal. The Northeast Division had the greatest departure with an average of 44.5 °F which was a departure of -9.0 degrees. The West Central Division came closest to normal with an average of 46.0 °F, which was a departure from normal of -4.7 degrees. There were 189 new record daily cold maximum temperatures, of which 18 set new record low maximums for the month. In addition, there were 291 new daily record low minimum temperatures, of which 3 set new records for the month. The records weren't all on the cold side, however. There were 26 new record high maximum temperatures and 10 new record high minimum temperatures record during April. The warmest temperature reported during the month was 99 °F at Ashland, Clark County, and Wilmore 16SE, Comanche County, on the 13th. The coldest temperature reported during April was 4 °F. This was reported at multiple locations and dates with the latest at Atwood, Rawlins County, on the 8th

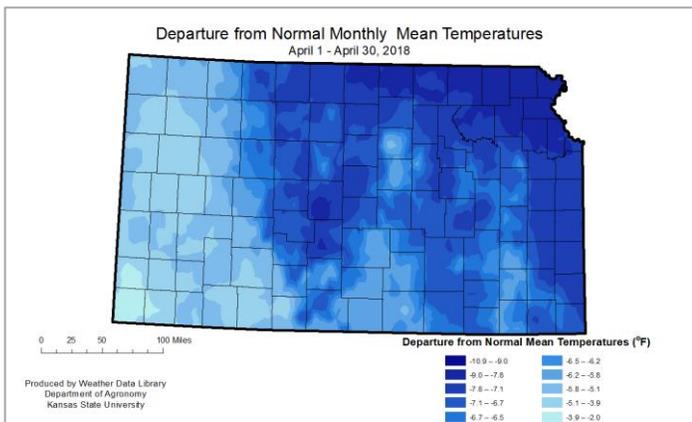
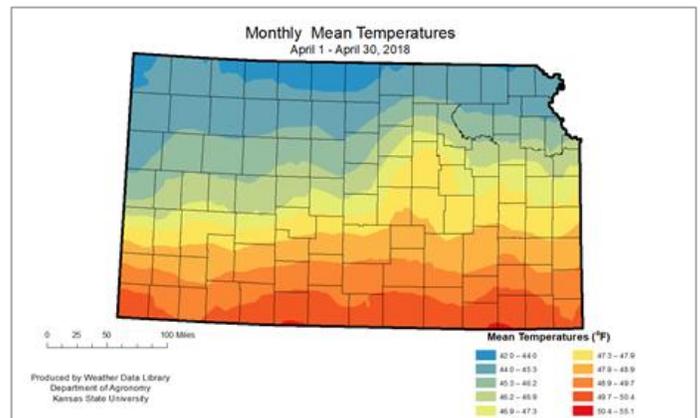
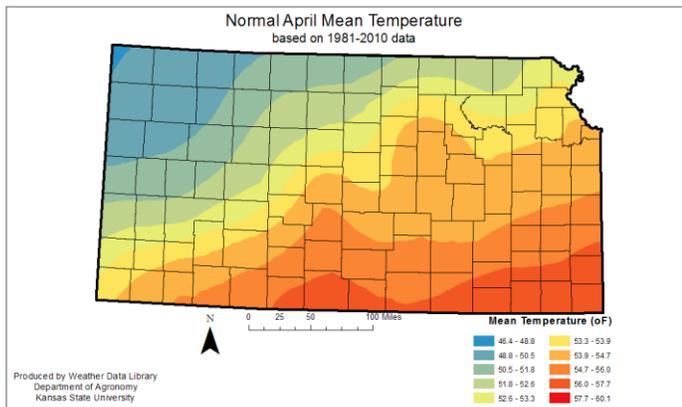
Temperature Week of April 11-17: As another wave of cold air arrived over the weekend and persisted through the beginning of the week, temperatures were cooler than normal in all climate divisions. The statewide average temperature was 48.7 °F, or 4.0 degrees cooler than normal. The North Central Division had the greatest departure from normal with an average of 46.7 °F, or 5.6 degrees cooler than normal. The Southwest Division came closest to normal, with an average of 50.9 °F or 2.0 degrees cooler than normal. Warmer than normal temperatures at a few locations for the period weren't enough to bring the Southwest divisional average up to normal. The highest maximum temperature was 99 °F at Ashland, Clark County, on the 13th. The lowest minimum temperature was 12 °F at both Alton 6ESE, Osborne County, on the 16th.

Temperature Week of April 18-24: Cold air arrived over the weekend and persisted through the beginning of the week, temperatures were cooler than normal in all climate divisions. The statewide average temperature was 48.7 °F, or 6.3 degrees cooler than normal. The Northeast Climate Division had the greatest departure from normal with an average of 47.8 °F, or 7.6 degrees cooler than normal. The West Central Division came closest to normal, with an average of 47.6 °F or 4.9 degrees cooler than normal. The few locations with warmer than normal temperatures for the period weren't enough to bring any divisional average up to normal. The highest maximum temperature was 97 °F at both Ashland, Clark County and Coldwater, Comanche County, on the 18th. The lowest minimum temperature was 16 °F at Plainville 4 WNW, Rooks County, on the 20th.

Climate Division	Kansas Climate Division Temperature Summary (°F)							
	April 1-30, 2018							
	Maximum	Minimum	Average	Departure	High	Date	Low	Date
Northwest	60.6	28.7	44.7	-4.9	88	12	4	7
West Central	62.7	29.2	46.0	-4.8	92	13	10	7
Southwest	65.6	31.6	48.6	-4.9	99	13	4	1
North Central	59.2	30.7	45.0	-7.8	91	13	8	7
Central	61.9	32.4	47.1	-6.7	95	13	8	7
South Central	63.5	34.2	48.8	-6.4	99	13	14	4
Northeast	57.2	31.9	44.5	-9.0	88	14	12	7
East Central	58.7	34.4	46.5	-7.6	87	13	15	4
Southeast	61.8	36.0	48.9	-6.8	87	13	17	7
STATE	61.2	32.1	46.7	-6.5	99	13th	4	7th

Data Source: KSU Weather Library

Below are the weekly mean temperatures and the normal for the time period, as well as the departure from normal temperatures from Kansas State University Department of Agronomy. (Maps based data from the Cooperative Observer and Kansas Mesonet, provided by on KSU Weather Data Library.)



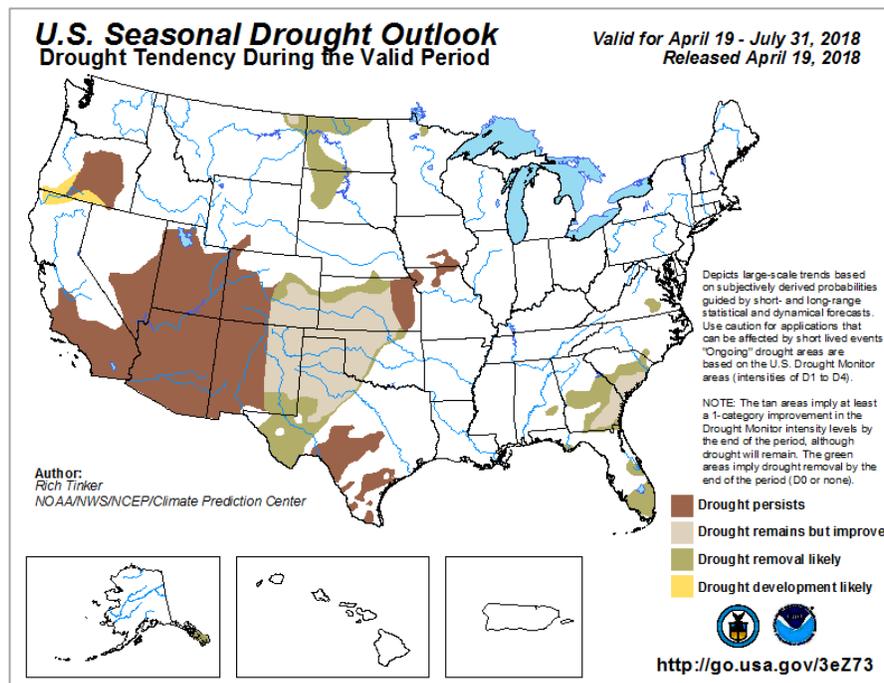
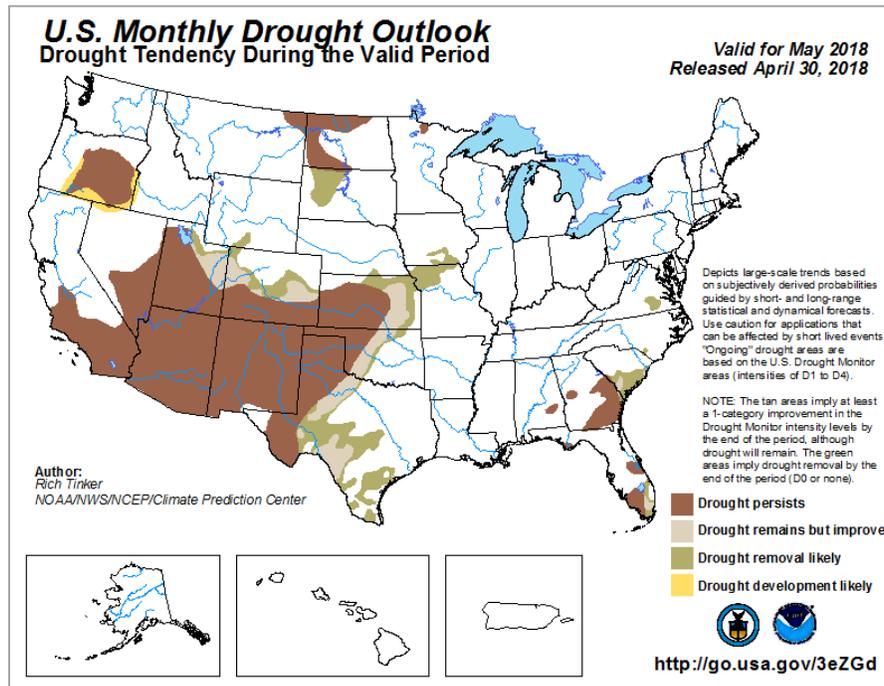
Temperature maps are also available from the High Plains Regional Climate Center at various time intervals. <http://www.hprcc.unl.edu/maps.php?map=ACISClimateMaps>

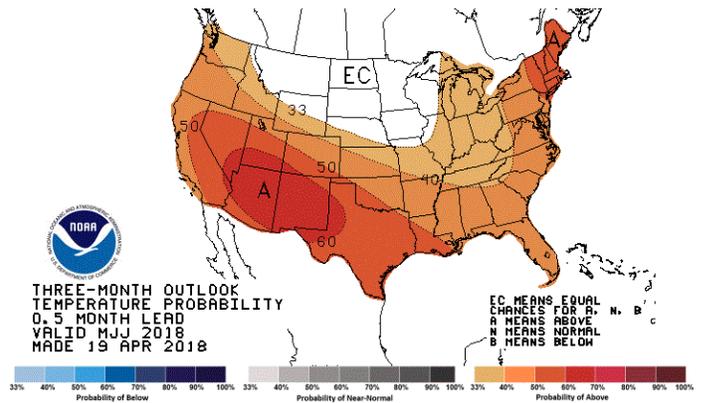
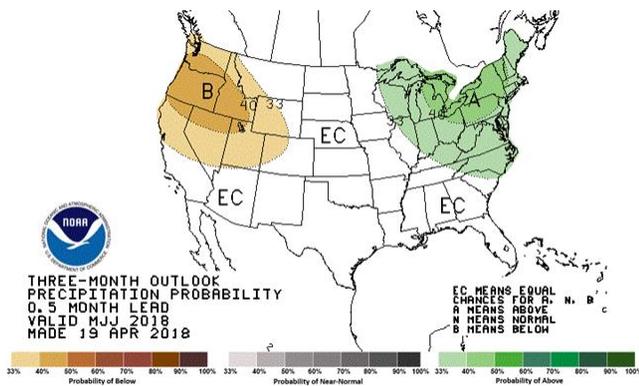
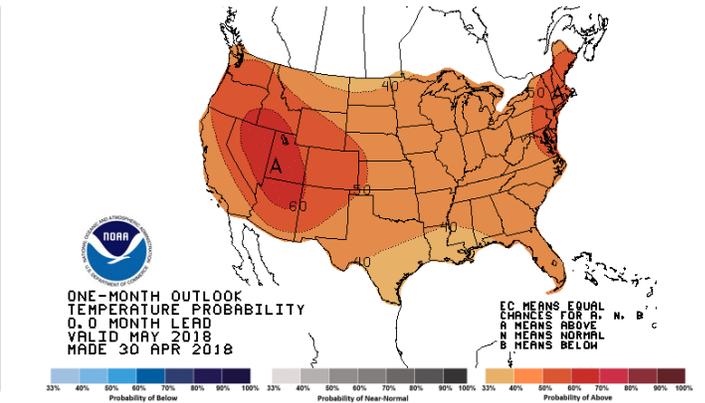
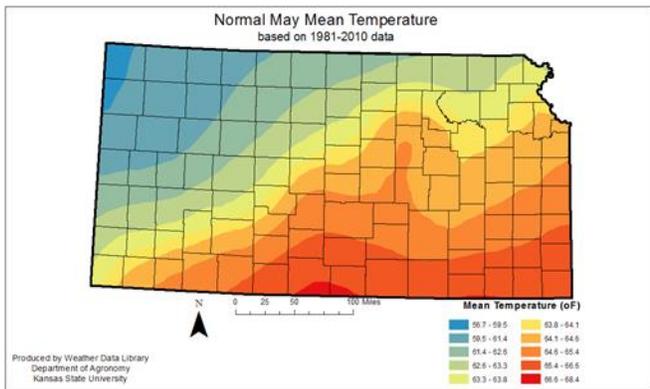
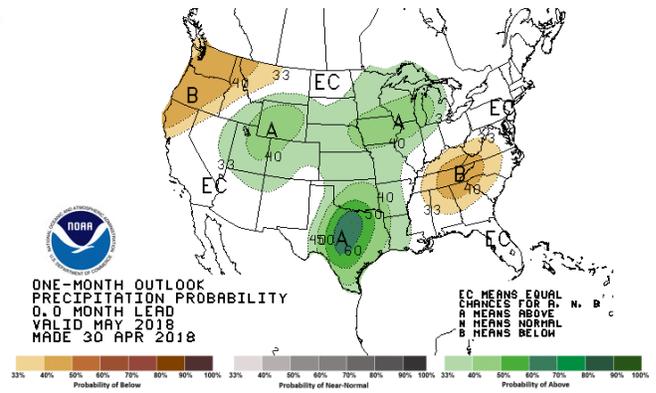
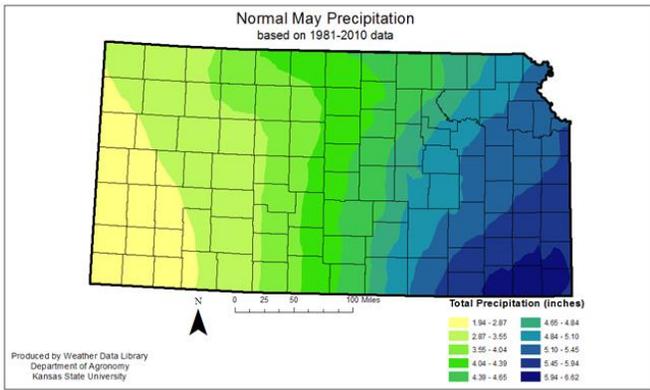
Future Outlook

The Monthly Drought Outlook indicates drought conditions to remain in southern, central and western Kansas. Improvement of drought conditions is possible in scattered areas of east and northeast Kansas. The May outlook has a slight chance for wetter than normal conditions across the state. The temperature outlook is for cooler than normal temperatures statewide. Unless May moisture is significant, that combination is unlikely to result in significant improvement of the drought conditions. With the wet summer last year, current dryness, and the cool start to the year, increased fire danger continues in Southwest Kansas.

Seasonal Outlook (3-month) favors continued drought with possible improvement in south central, central and western Kansas. For the April 19-July 31 time period probability favors below normal precipitation and above normal temperatures for western parts of the state. The remaining areas have equal chances of below or above normal precipitation and temperatures for the period.

The individual temperature and precipitation outlooks that contribute to these outlooks are provided below for the one and three month periods.





Additional outlooks for various 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.

Known issues:

Stage II water restrictions, remain in place under Resolution 03-16 are in place for the **City of Russell**, Russell County water customers as of May 4, 2018 (www.russellcity.org/148/Current-Water-Status). The water restrictions include a prohibition on outdoor watering from 10:00 am to 7:00 pm. It also prohibits the waste of water.

Stage II water restrictions have been in place for the **City of Victoria**, Ellis County since June 2017. No lawn watering or filling of private swimming pools is allowed. Watering of trees, flowers and gardens allowed, but not between 10 am and 5 pm. (May 4, 2018, <http://victoriaks.com/utilities.htm>.)

Water Emergency currently in place for **Medicine Lodge**, Barber County. Citizens may water before 10 am and after 9 pm.(<https://medicinelodge.kansas.gov/> May 4, 2018)

Surface Water Supply Conditions as of April 17

Kansas River basin: Inflow to Tuttle Creek, Perry, Milford, and Clinton reservoirs continue to decline in April. However, storage in the basin has not been significantly impacted from the abnormally dry conditions in recent months. Clinton maintained a full pool and the other three reservoirs were below the top of multipurpose elevation due to planned seasonal drawdowns. The lower seasonal elevations may extend longer than planned if inflow conditions don't improve. Flow in the Kansas River remained less than half of historic median values with the majority of the flow from reservoir releases, primarily Tuttle Creek, which is experiencing a slight decline in elevation.

Marais des Cygnes basin: Melvern, Pomona, and Hillsdale reservoirs are all set to minimum gate settings. Melvern and Pomona have not refilled from their lower winter target elevation and are experiencing a slight declining trend in April. Reservoir releases have not been necessary to supplement flow in the Marais des Cygnes River.

Cottonwood/Neosho basin: Inflows to Marion, Council Grove, and John Redmond reservoirs are generally low and streamflow is declining throughout the system. Conservation storage is full in John Redmond but steadily declined in Marion and Council Grove. Releases are necessary to maintain sufficient streamflow and releases from John Redmond are on-going to meet the needs of Wolf Creek power plant.

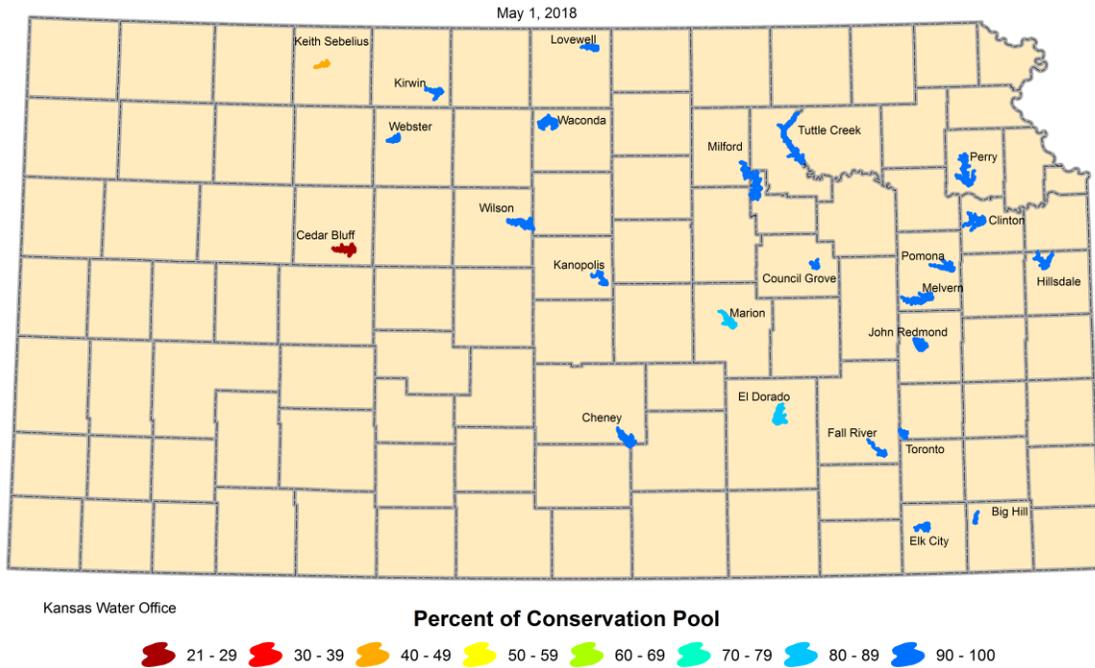
Verdigris basin: Toronto, Fall River, and Big Hill reservoirs are at or near conservation pool levels; Elk City Reservoir is maintaining above normal pool. Reservoir releases are necessary to supplement low flow conditions of the Fall and Verdigris Rivers but reservoir storage is healthy.

Saline basin: The elevation at Wilson Lake is being maintained slightly above normal pool and streamflow conditions are maintaining near median values.

Smoky Hill basin: The middle Smoky Hill basin maintained streamflow but has not experience any significant runoff events. Inflow to Kanopolis Lake remained slightly below median historic values and a healthy rain and runoff event will be needed to refill storage to the summer target elevation of 1,467.7, 4.7 feet above the top of Multipurpose. The target flow of 20 cfs at the Mentor gage has been maintained with minimal releases from Kanopolis, allowing a very gradual rise in elevation in April.

General Reservoir Conditions

Federal Reservoir Status



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		4/30/2018		
Norton ¹	2304.3	2292.46	-11.84	42
Harlan County, NE	1945.73	1940.66	-5.07	79.7
Lovewell ¹	1582.6	1582.21	-0.39	97
Milford ¹	1144.4	1142.27	-2.13	91.5
Cedar Bluff	2144	2117.18	-26.82	29
Kanopolis ¹	1463	1463.12	0.12	100
Wilson ¹	1516	1516.29	0.29	100
Webster ¹	1892.5	1893.75	1.25	100
Kirwin ¹	1729.3	1729.67	0.37	100
Waconda ¹	1455.6	1454.81	-0.79	95.6
Tuttle Creek ¹	1075	1074.18	-0.82	96.5
Perry ¹	891.5	889.31	-2.19	89.1
Clinton ¹	875.5	875.79	0.29	100
Melvern ¹	1036	1034.81	-1.19	94.6
Pomona ¹	974	972.93	-1.07	92.5
Hillsdale ¹	917	917.15	0.15	100
Arkansas River Basin		5/1/2018		
Cheney	1421.6	1421.04	-0.56	97
El Dorado	1339	1334.63	-4.37	80
Toronto ¹	901.5	904.11	2.61	100
Fall River ¹	948.5	949.79	1.29	100
Elk City ¹	796	797.07	1.07	100
Big Hill	858	857.97	-0.03	100
Council Grove ¹	1274	1271.83	-2.17	87
Marion ¹	1350.5	1348.41	-2.09	84
John Redmond ¹	1039	1041.02	0.02	100

¹Lake 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.

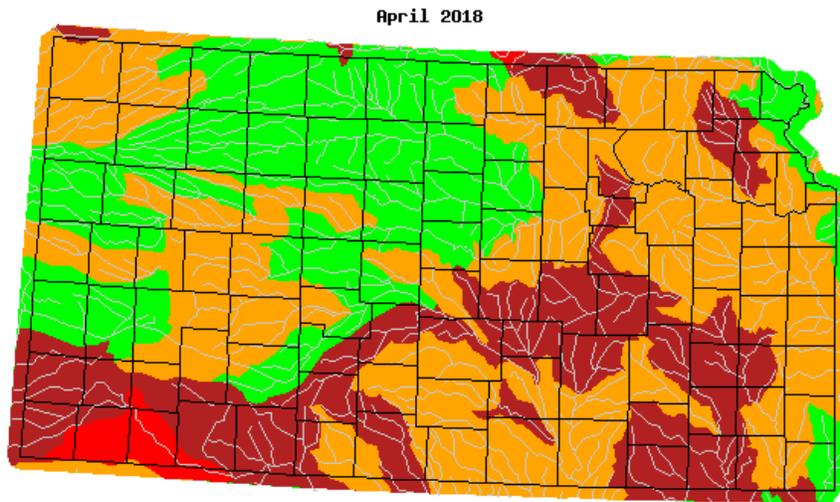
Harmful Blue-Green Algal Blooms (lake water safety)

KDHE issues two levels of public health protection notifications for blue-green algae (BGA) Blooms: a Public Health Watch and Public Health Warning. 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. Warning that conditions are unsafe and water contact should not occur include that no swimming, wading, skiing or consumption of the water should occur. Spring evaluation resumed in March. There are currently no warnings and watches in effect.

Streamflow Conditions

WaterWatch summarizes streamflow conditions in a region (state or hydrologic unit) in terms of the long-term typical condition at stream gages in the region.

April 2018 average stream flow compared to historical is reflected in the map below.



Monthly streamflow

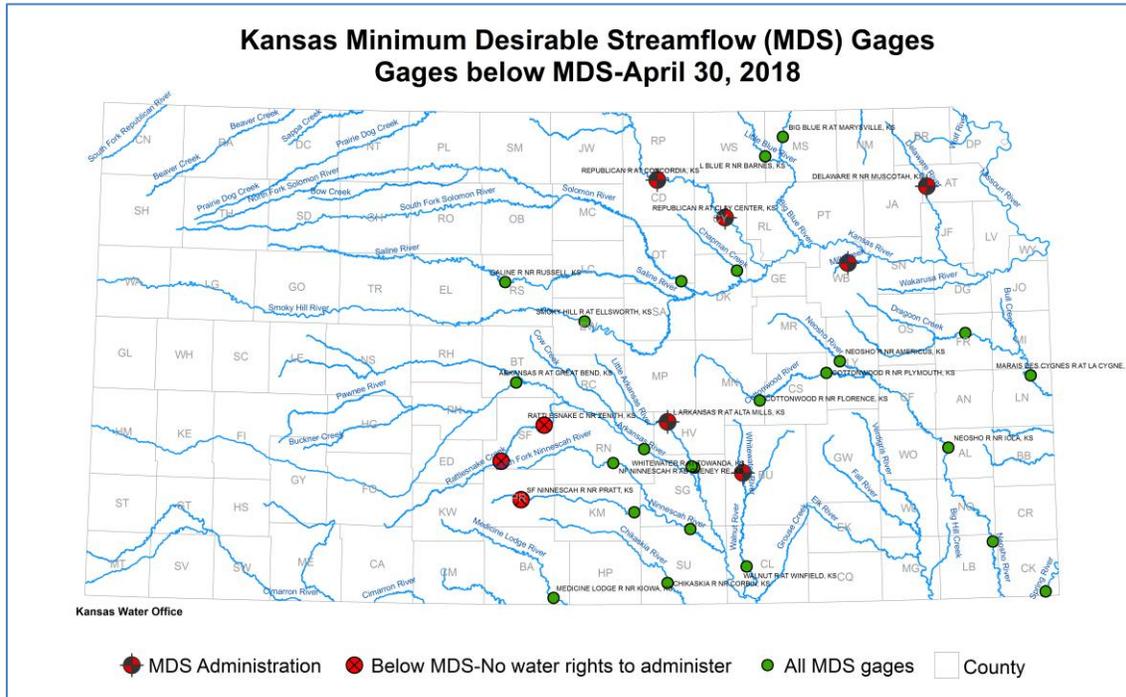
Explanation - Percentile classes						
Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	



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 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. MDS administration is occurring at numerous locations. Please see table below of current administration.



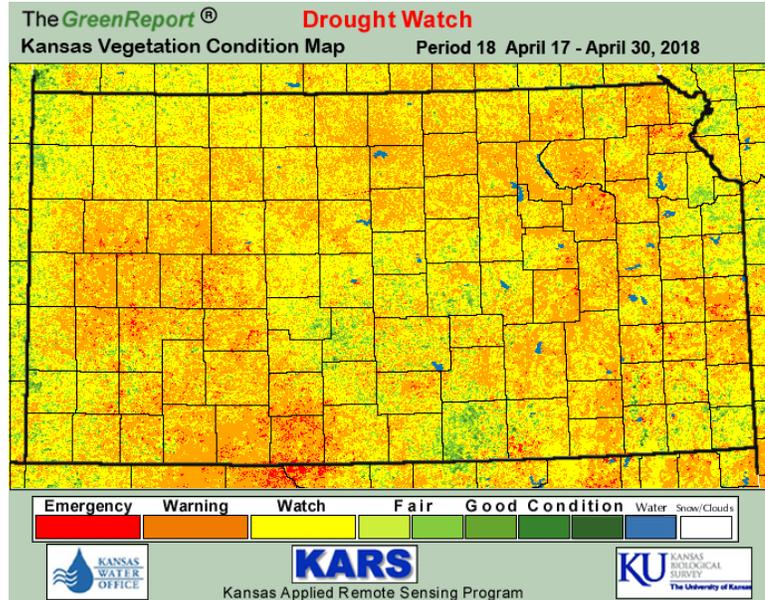
The table below provides a snapshot of conditions for streams of interest to the Kansas Department of Agriculture, Division of Water Resources. There are locations where flows are below MDS, but administration is not in effect since there are no junior diversion above each gage and others where the below MDS flows will be of sufficient number of days to require administration soon.

Streamflows as of April 30, 2018			
Gaging Station	Current Flow	Apr MDS	Comment
Republican River at Concordia	73	150	Admin began April 13, 2018
Republican River at Clay Center	169	250	Admin began April 13, 2018
Little Blue River near Barnes	176	150	
Mill Creek near Paxico	13	25	Admin began April 12, 2018
Delaware River near Muscotah	13	20	Admin began March 23, 2018
Rattlesnake Creek near Macksville	1	10	No surface water diversions junior to MDS above gage
Rattlesnake Creek near Zenith	11	15	No surface water diversions junior to MDS above gage
Little Arkansas River at Alta Mills	6	8	MDS admin began Aug 10, 2017
South Fork Ninescah River near Pratt	6	8	No surface water diversions junior to MDS above gage
Whitewater River near Towanda	17	20	Admin began April 12, 2018
Medicine Lodge River near Kiowa	69	60	

Soil, Crop and Vegetation

Kansas Vegetative Conditions

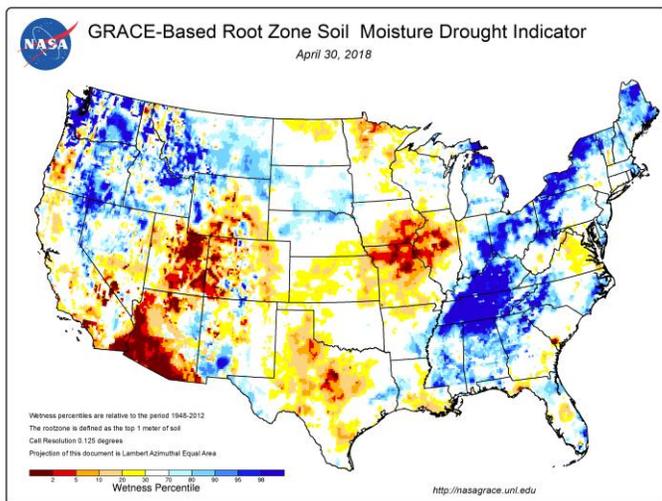
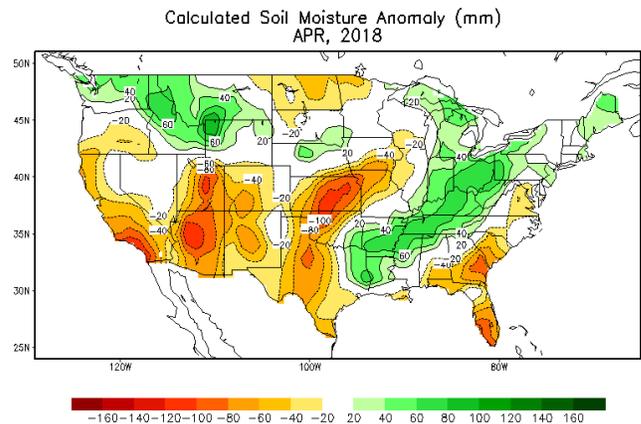
The Kansas Vegetative Condition map provides current conditions. It is produced by Kansas Applied Remote Sensing Program using satellite data. Areas in yellow, orange and red indicate areas of vegetative stress. The period has shown slight improvement in south central and northwest Kansas where wheat is trying to grow.



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. The soil anomaly is provided below indicates deficit soil moisture for most of Kansas.

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

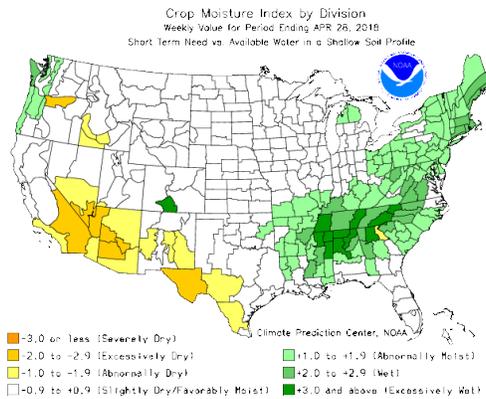


NASA generates soil moisture drought indicators each week using GRACE satellite data integrated with other observations. Indicators describe wet or dry conditions as a percentile of probability of occurrence within the period of record (1948-present).

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.

USDA Crop Progress and Condition provide some indication of the climatic effects on soil, and livestock feed and water supplies. The Kansas report by USDA's National Agricultural Statistics Service for the state as a whole for the week ending April 29, 2018 indicates topsoil moisture supplies rated 27 percent very short, 32 short, 40 adequate, and 1 surplus. Subsoil moisture supplies rated 27 percent very short, 38 short, 35 adequate, and 0 surplus.

Field Crops Report: Winter wheat condition rated 16 percent very poor, 34 poor, 37 fair, 12 good, and 1 excellent.



Based on the Palmer Drought Index, 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 [Weekly Weather and Crop Bulletin](#).

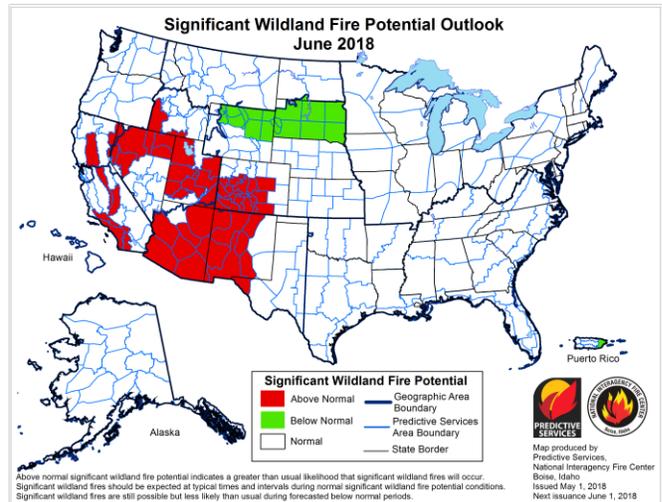
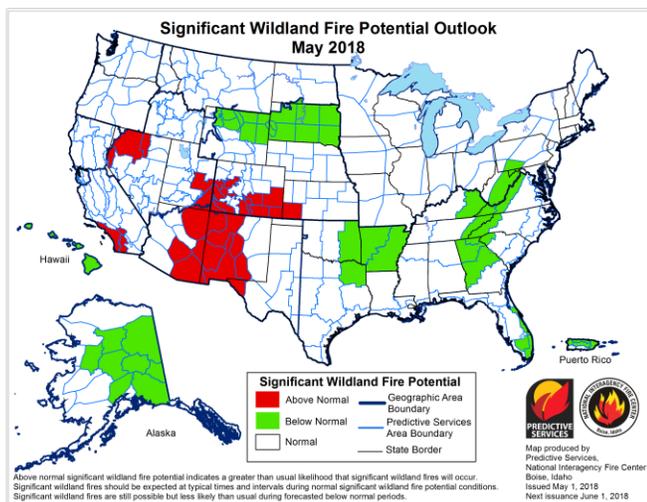
Fire

April conditions resulted in numerous wildfires and Red Flag warnings alerting citizens to potential increases in wildfire activity due to ideal conditions for wildland fire combustion and rapid spread. Dry conditions increase the potential for wildfire. According to the National Interagency Fire Center, wildfire activity is likely to continue in western and southern Kansas in April and in the west into May. Periods of concern will be wind events coupled with low humidity that impact fire activity. Kansas Forest Service provides a grassland fire danger index at:

http://www.kansasforests.org/fire_management/grasslandfireindex.html.

Significant Wildland Fire Potential Outlook is issued monthly for the United States,

https://www.predictiveservices.nifc.gov/outlooks/monthly_seasonal_outlook.pdf. These indicate portions of Kansas will remain above normal in wildfire activity in April and May 2018.



Kansas Climate Summary

The Kansas Weekly Climate Summary and Drought Report are 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 KWO web site, <http://www.kwo.ks.gov/reports2/climate-and-drought-monitoring-response>, 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 (<https://hprcc.unl.edu/>) 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.ks.gov .

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://veg dri.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, 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 KWO, provide guidance regarding drought preparedness and response. These are available at <http://www.kwo.ks.gov/reports2/climate-and-drought-monitoring-response>.

[USDA Drought Programs and Assistance](#) website (<https://www.usda.gov/topics/disaster/drought/usda-drought-programs-and-assistance>) listing the various USDA programs and agencies to assist with drought issues.

The National Interagency Coordination Center in Boise, Idaho, produces wildfire potential outlook maps monthly. (<https://www.predictiveservices.nifc.gov/outlooks/outlooks.htm>)

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

April 2018 Summary Station ¹	Precipitation (inches)			Temperature °F			
	Total	Departure	Percent Normal	Mean	Departure	Extreme (Date)	
						Highest	Lowest
West							
Burlington, CO	1.71	0.25	117%	46.0	-1.9	86 (29,12)	14 (7)
Dodge City	0.97	-0.85	53%	49.4	-4.5	96 (12)	16 (7,6)
Garden City	0.40	-1.32	23%	48.3	-4.8	94 (12)	14 (15)
Goodland	1.48	-0.11	93%	46.0	-3.2	86 (29)	12 (6)
Guymon, OK	1.06	-0.45	70%	52.3	-3.0	94 (12)	19 (7)
Hill City	0.57	-1.55	27%	46.4	-5.2	86 (29)	5 (7)
Lamar, CO	1.15	-0.17	87%	50.4	-1.8	92 (12)	18 (2)
McCook, NE	1.02	-1.29	44%	45.2	-4.3	86 (29)	3 (7)
Springfield, CO	0.48	-0.79	38%	48.3	-3.3	88 (12)	17 (7)
Central							
Concordia	0.99	-1.46	40%	46.4	-6.7	85 (12)	12 (7)
Hebron, NE				45.4	-5.6	83 (30,12)	14 (7)
Medicine Lodge	1.39	-1.04	57%	51.1	-5.1	96 (12)	19 (7,4)
Ponca City, OK	2.08	-1.36	60%	52.6	-5.8	89 (17,13)	22 (16,7)
Salina	1.20	-1.85	39%	49.7	-5.5	90 (12)	15 (7)
Wichita (ICT)	1.76	-0.83	68%	50.7	-5.4	87 (12)	18 (7)
East							
Bartlesville, OK	1.49	-2.49	37%	51.9	-6.9	88 (17)	23 (16,8)
Chanute	1.13	-3.27	26%	51.1	-5.8	82 (30)	23 (7,4)
Fall City, NE	0.71	-2.47	22%	45.2	-8.0	85 (13)	11 (2)
Johnson Co. Exec. Apt	0.92	-3.07	23%	47.4	-7.7	80 (30,13)	17 (4)
Joplin, MO	2.11	-2.36	47%	51.8	-6.6	83 (12)	23 (7)
Kansas City (MCI), MO	1.04	-2.66	28%	47.4	-7.5	83 (13)	16 (7)
St. Joseph, MO	0.56	-3.23	15%	45.9	-8.3	84 (13)	10 (2)
Topeka (TOP)	1.06	-2.47	30%	48.4	-6.7	84 911)	18 (7,4)
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							