Kansas Water Office

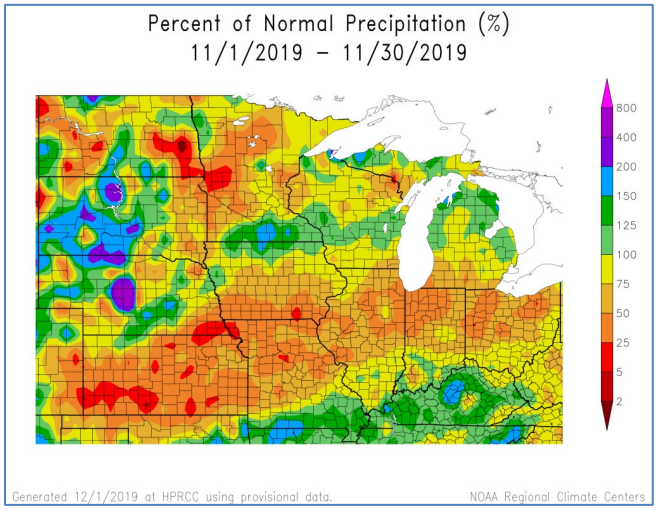
KANSAS CLIMATE UPDATE
November 2019 Summary

Highlights

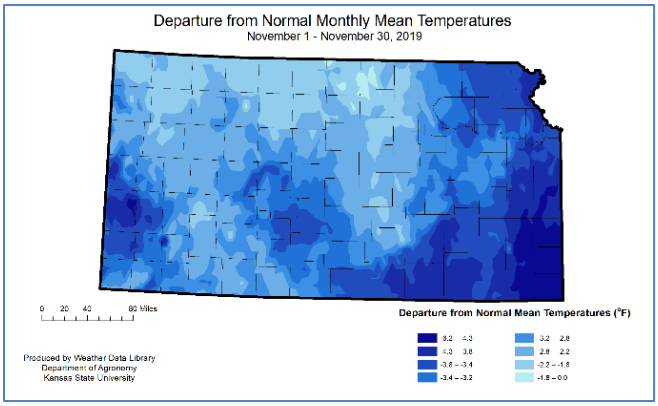
- U.S. Drought Monitor indicated continuing and expanding areas of abnormally dry (D0), moderate drought (D1) and severe drought (D2) in western and south central Kansas conditions. November 19 a small area was declared as extreme drought (D3) including parts of Finney, Grant, Kearny, Morton and Stanton counties.

- Wildfires break out in began in very late October continuing in November with the drying out of fuels. One fire near St Francis, Cheyenne County November 8th was declared a disaster by the Governor affecting an estimated 10,000 acres.

- In November, all of Kansas was below normal for precipitation. Less than 50% of average precipitation occurred in a band from Kansas to Ohio across the Midwest.



- Temperatures ranged from below zero into the 80's in November across the state. The average temperature was 39.7°F, which is 2.9 degrees cooler than normal for the month.

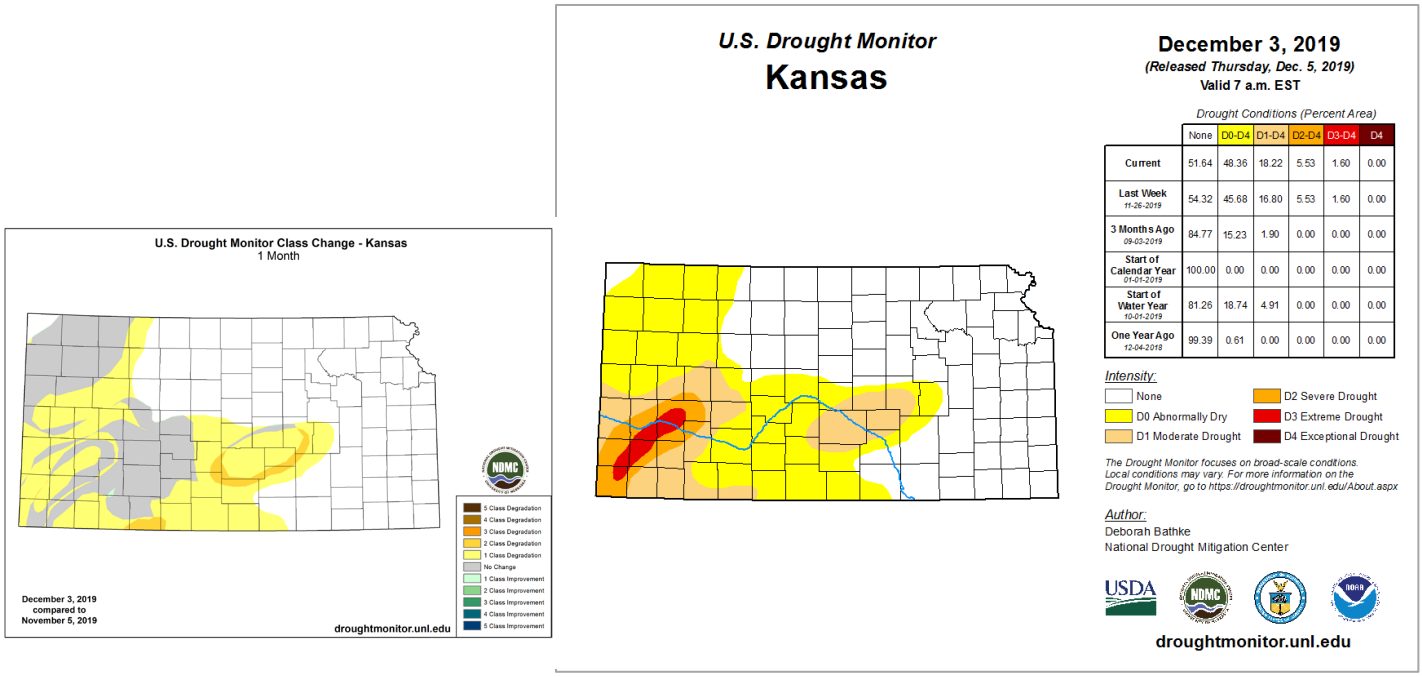


- Drought Outlook favors drought continuing for the current area of drought, with equal chances of below, near or above normal temperatures and precipitation likely in December for most of Kansas.

General Drought Conditions

The U.S. Drought Monitor indicated dry and drought conditions in parts of western and central Kansas throughout the month. These drought conditions expanded and intensified in parts of South Central and Southwest Kansas. The condition at the end of the month is shown below in Figure 1. Changes in drought classification over the month is also shown.

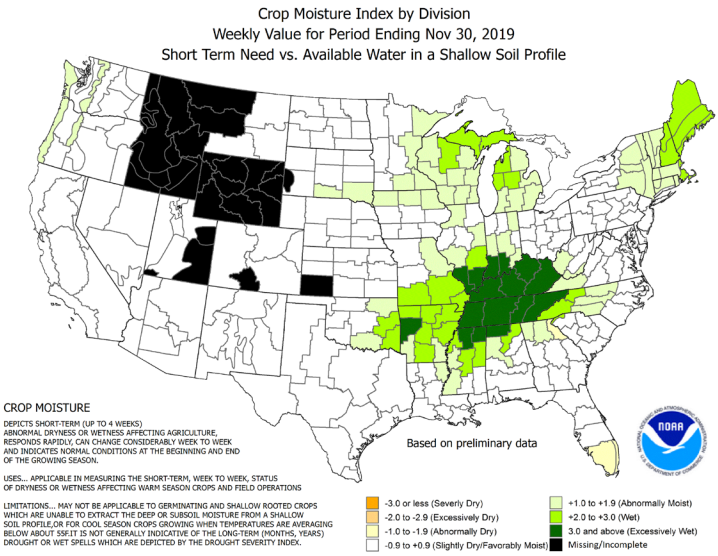
Figure 1. U.S. Drought Monitor Maps of Drought status



More information can be found on the U.S. Drought Monitor web site https://droughtmonitor.unl.edu/ .

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 Crop Moisture (Figure 2) component evaluates short term needs and available water. More information on the PDSI and its parts can be found at http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml.

Figure 2.



Climate Summary - Precipitation

November was drier than normal. Statewide average precipitation for the month was 0.57 inches, 40 percent of normal, ranking as the 37th driest November in the 125-year record. The Northwest Climate Division had the greatest percent of normal, with a divisional average of 0.62 inches, 76 percent of normal. The Southeast Division had the highest average amount, with an average of 1.13 inches, 44 percent of normal. The highest 24-hour rainfall total for a National Weather Service Cooperative station was 0.94 inches at Iola 1W, Allen County on the 22nd. The greatest 24-hour rainfall total for a Community Collaborative Rain, Hail and Snow network station was 1.25 inches at Frontenac 0.4 SW, Crawford County on the 30th. The greatest monthly precipitation totals for November: 2.32 inches at Bartlett, Labette County (NWS); 2.63 inches at Baldwin City 0.6 W, Douglas County (CoCoRaHS). Table 1 summarizes the monthly precipitation (KSU Weather Data Library).

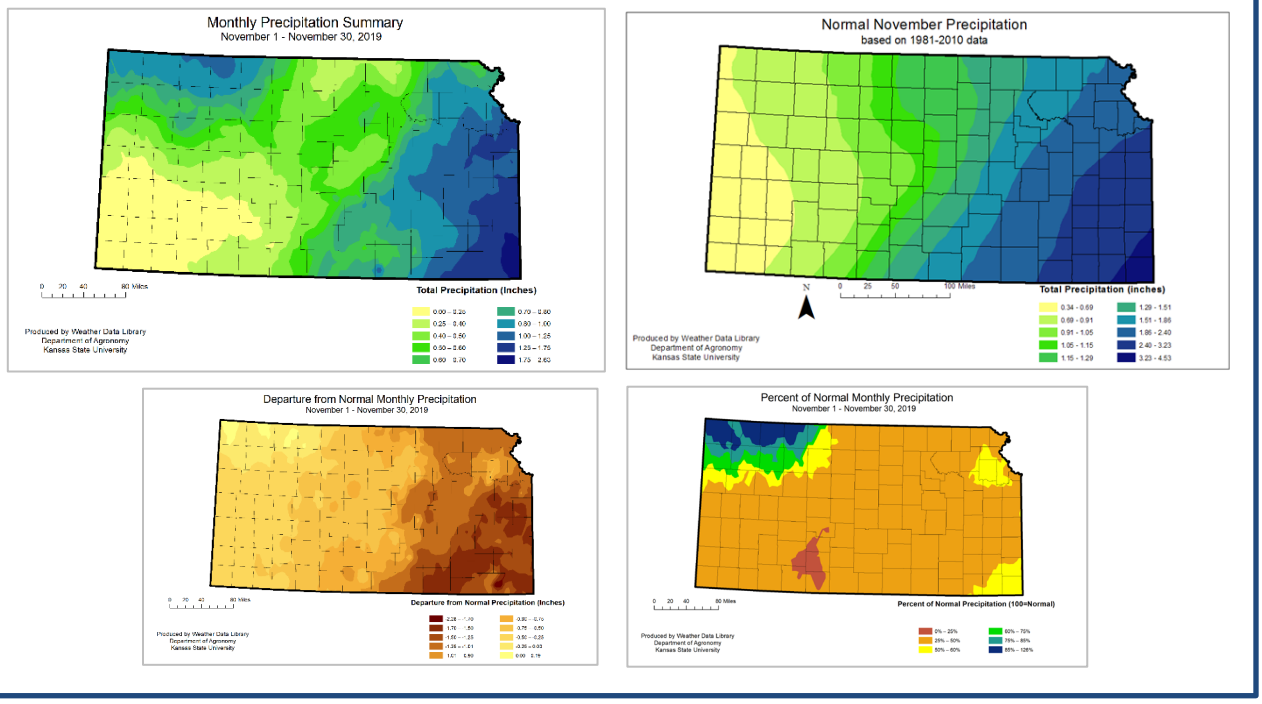
Table 1.

Kansas Climate Division Precipitation Summary (inches)

Climate Division	November 1 - 30, 2019			January 1 – November 30, 2019			April 1, 2019 – November 30, 2019			Sept 1, 2018 – November 30, 2019		
	Actual	Depart Normal*	% of Normal	Actual	Depart Normal*	% of Normal	Actual	Depart Normal*	% of Normal	Actual	Depart Normal*	% of Normal
Northwest	0.62	-0.20	76	23.54	2.75	113	21.18	2.69	115	2.21	-1.69	57
West Central	0.24	-0.55	30	21.20	1.06	105	17.91	0.27	102	1.77	-2.07	46
Southwest	0.17	-0.49	26	18.72	-0.51	97	15.43	-1.42	92	1.31	-2.48	35
North Central	0.51	-0.72	41	32.75	5.59	121	29.11	5.44	123	4.48	-1.36	77
Central	0.38	-0.86	31	32.96	4.60	116	29.19	4.78	120	3.45	-2.44	59
South Central	0.53	-0.96	36	38.63	8.43	128	34.62	9.04	135	6.02	-0.71	89
Northeast	0.61	-1.16	34	43.04	9.26	127	37.79	8.22	128	6.37	-1.74	79
East Central	0.97	-1.20	45	44.59	8.07	122	39.21	7.61	124	5.97	-2.94	67
Southeast	1.13	-1.46	44	55.90	16.22	141	49.97	16.29	148	9.64	-0.63	94
STATE	0.57	-0.85	40	34.51	6.16	122	30.42	5.91	124	4.59	-1.76	72

The maps of Figure 3 below summarize precipitation for the month. (State maps based on data from the Cooperative Observer and Kansas Mesonet, and provided by KSU Weather Data Library. State weekly maps of precipitation information can be accessed at http://climate.k-state.edu/maps/weekly/.)

Figure 3. Monthly Precipitation maps



Climate Summary-Temperature

Temperatures for November were cooler than normal. Statewide average temperature for the month was 39.7 oF, which is 2.9 degrees cooler than normal. This ranks as the 33rd coolest November on record. The Northwest Division was the warmest with an average of 37.3 oF, 1.8 degrees cooler than normal. The Southeast Division was the coolest, with an average of 41.5 oF, 4.4 degrees cooler than normal. Even with the cooler pattern, all central/west divisions saw highs in the 80s. The warmest maximum temperature was 86 oF at Healy, Lane County, on the 10th. The coldest minimum temperature was -5 oF at Oakley 19SW, Logan County, on the 12th. There was three daily record maximum temperatures. On the other hand, there were 113 new record low maximum temperatures set and 123 record low minimum temperatures set. There were no new record warm minimum temperatures. Table 2 summarizes the monthly temperatures (KSU Weather Data Library).

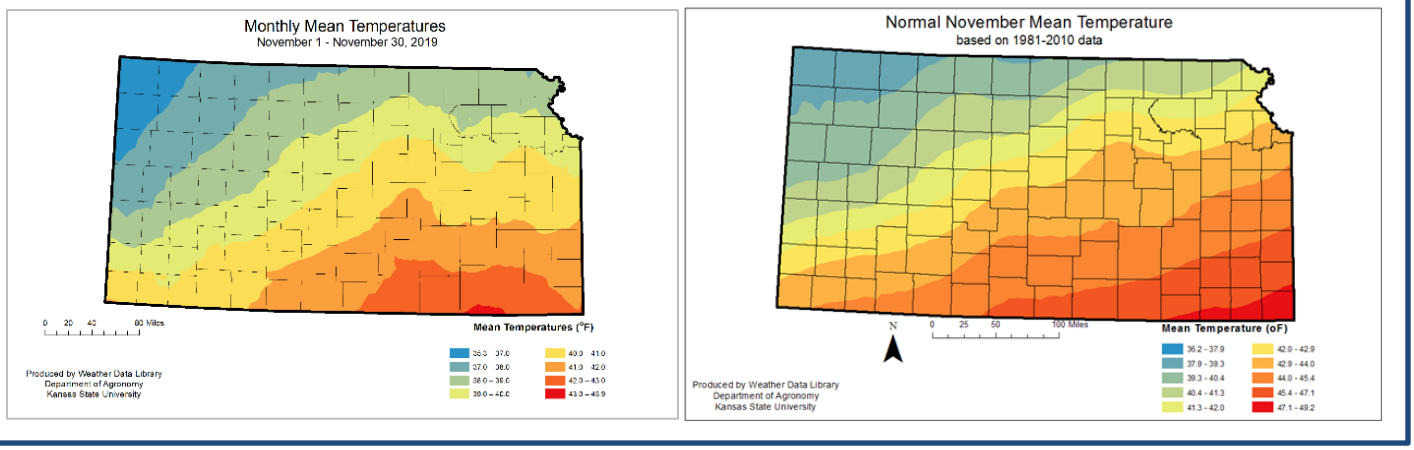
Table 2.

Climate Division	Kansas Climate Division Temperature Summary (ºF) November 2019							
	Maximum	Minimum	Average	Departure*	High	Date	Low	Date
Northwest	52.5	22.0	37.3	-1.8	82	10	-2	12
West Central	54.2	22.8	38.5	-2.0	86	10	-5	12
Southwest	57.4	24.6	41.0	-1.8	82	10	-3	12
North Central	51.8	25.8	38.8	-2.4	80	10	1	12
Central	53.8	26.5	40.1	-2.7	80	10	1	12
South Central	56.0	27.5	41.7	-2.8	80	10	2	12
Northeast	50.2	26.2	38.2	-4.0	74	10	5	12
East Central	51.5	28.0	39.8	-3.8	77	10	4	12
Southeast	53.8	29.2	41.5	-4.4	76	11	3	12
STATE	53.5	25.8	39.7	-2.9	86	10th	-5	12th

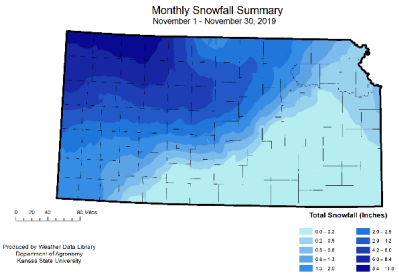
*Departure from normal is departure from the base period of 1981-2010, KSU Weather Data Library.

The maps in Figure 4 below summarize temperature for the month. (State maps based on data from the Cooperative Observer and Kansas Mesonet, and provided by KSU Weather Data Library. State weekly maps of precipitation information can be accessed at http://climate.k-state.edu/maps/weekly/.)

Figure 4. Monthly Temperature Maps



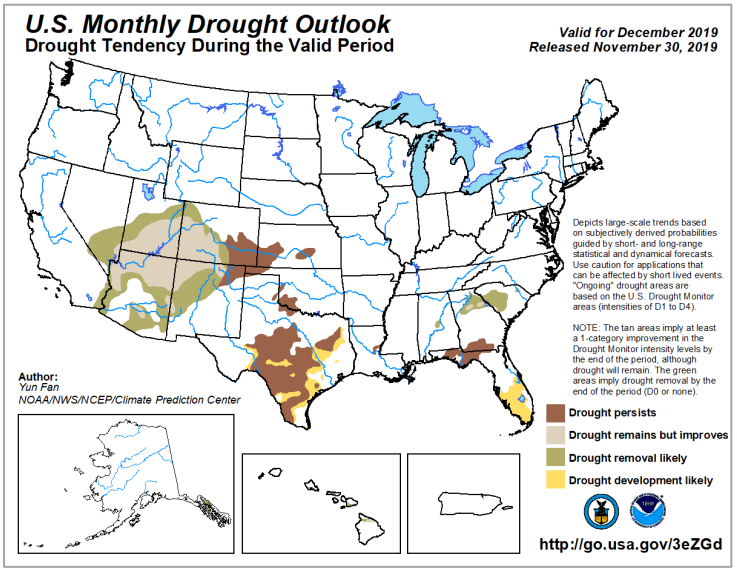
Severe weather was limited to winter weather conditions in November. Heavy snow and high winds complicated travel during the Thanksgiving week The only precipitation records set during the month were for daily snowfall amounts, and these were set at just seven locations . There were no reports of tornadoes, hail or damaging wind.

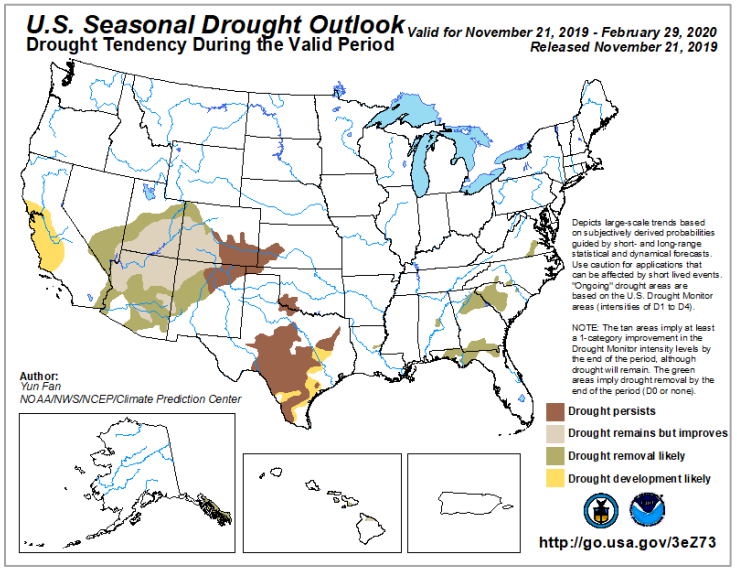


Outlooks

The Monthly Drought Outlook issued November 30, 2019 indicates drought conditions in southwest Kansas to persist. The Seasonal Outlook (3-month) favors a small area of drought in Kansas persisting in the mid-November through February period. The individual temperature and precipitation outlooks that contribute to these outlooks are available below.

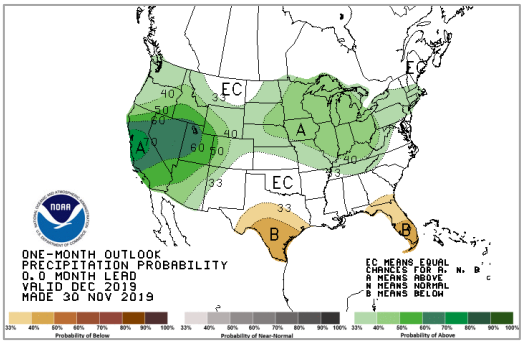
Figure 5. Drought Outlooks

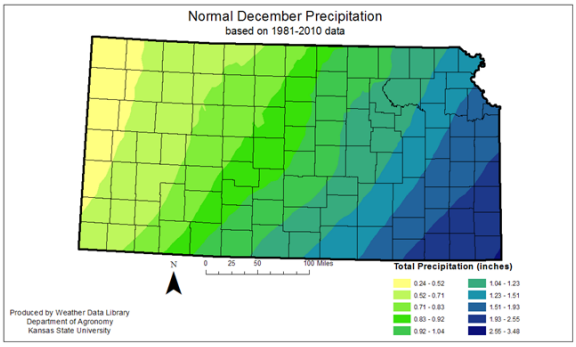


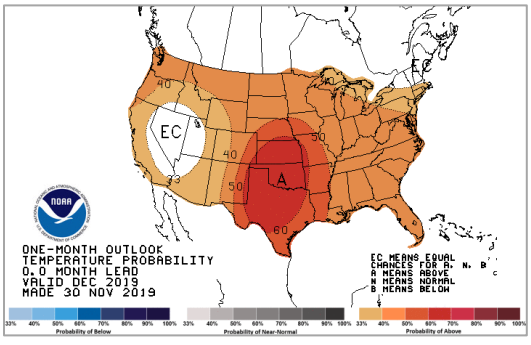


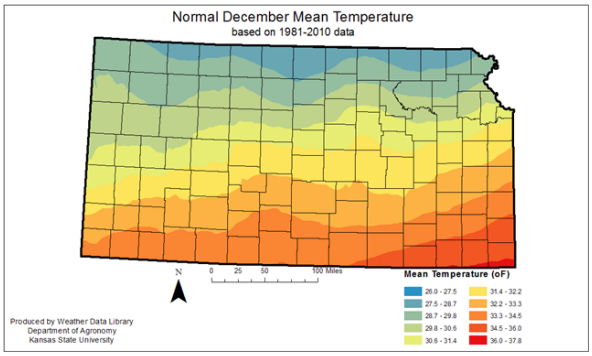
The monthly precipitation outlook has equal chances of below, near or above normal precipitation across most of western and southern Kansas with slightly increased chance of above normal precipitation favored across the northern parts of the state. The temperature outlook indicates equal chances of below, near and above normal temperatures across the state, with best chances of below normal temperatures to the east. One month outlooks are provided in Figure 6.

Figure 6. Next Month Precipitation and Temperature Outlooks



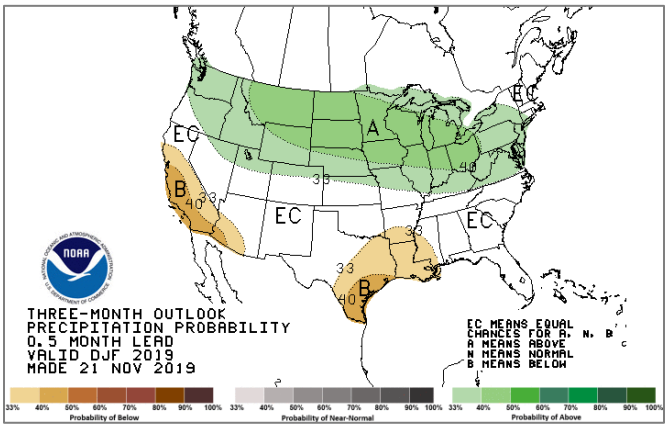


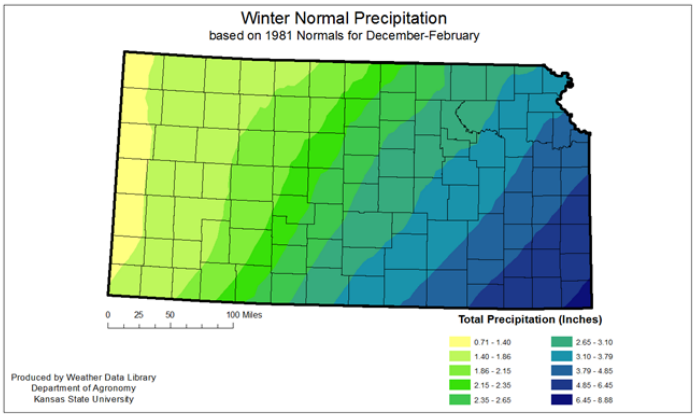


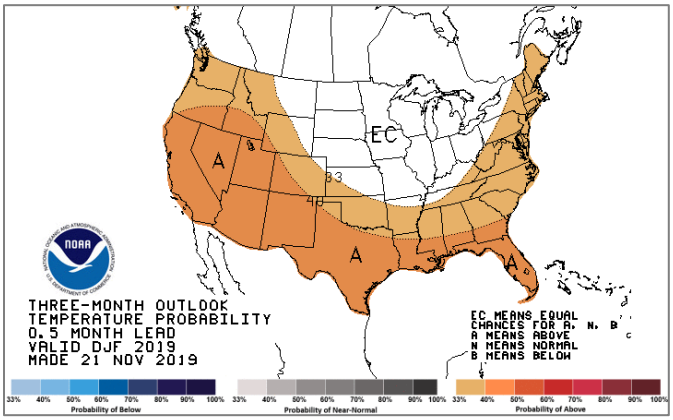


The U.S. three month outlook for December through February favors above-average precipitation (moderate chance) for only the northern edge of Kansas with equal chances of below, normal or above average precipitation for the majority of the state. Above normal temperatures are favored for southwest Kansas with equal chances of below, normal or above normal for the rest of the state.

Figure 7. Three Month Precipitation and Temperature Outlooks







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/)

Reservoir Storage

At the end of the month most reservoir conservation pools were full or almost full except Keith Sebelius, Cedar Bluff and Lovewell. Reservoir releases consider the entire Missouri basin system so releases continue in many locations to reduce flood pool storage accumulated from the above normal precipitation and runoff earlier in the year. Table 3 provides conservation pool status for each federal reservoir.

Table 3. Kansas Federal Reservoir Conservation Pool Levels

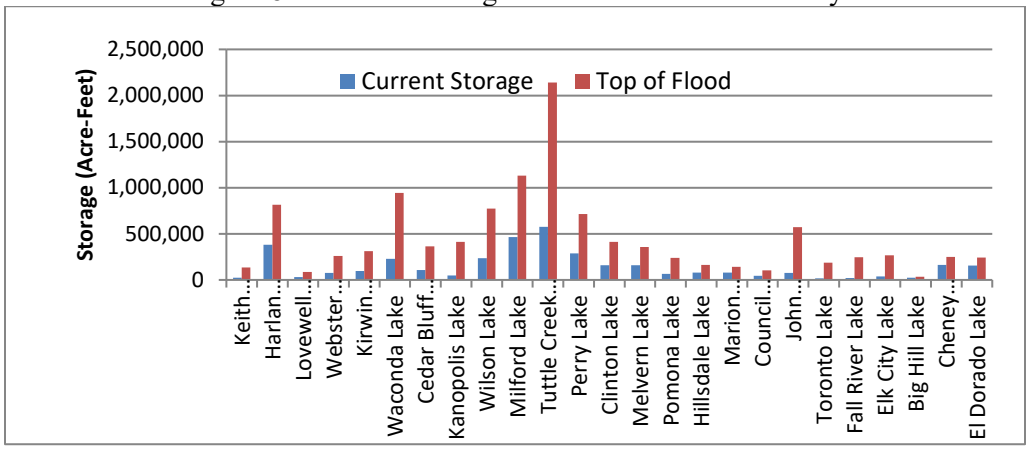
Reservoir	Top of Multipurpose / Conservation Pool (Feet MSL)	Multipurpose/Conservation Pool Elevation (Feet MSL)	Change from Top of Pool (Feet)	Percent of Conservation Pool Full
Kansas River Basin			**11/25/2019**	
Keith Sebelius Lake[1]	2304.3	2299.49	-4.81	72.6%
Harlan County Lake NE	1945.73	1950.44	4.71	100.0%
Lovewell Reservoir[1]	1582.6	1581.24	-1.36	89.0%
Webster Reservoir[1]	1892.45	1892.64	0.19	100.0%
Kirwin Reservoir	1729.25	1729.13	-0.12	99.4%
Waconda Lake[1]	1455.6	1456.33	0.73	100.0%
Cedar Bluff Reservoir	2144	2133.06	-10.94	62.5%
Kanopolis Lake[1]	1463	1462.45	-0.55	96.6%
Wilson Lake[1]	1516	1515.38	-0.62	97.7%
Milford Lake[1]	1144.4	1149.60	5.20	100.0%
Tuttle Creek Lake[1]	1075	1093.99	18.99	100.0%
Perry Lake[1]	891.5	898.58	7.08	100.0%
Clinton Lake[1]	875.5	880.65	5.15	100.0%
Melvern Lake[1]	1036	1037.24	1.24	100.0%
Pomona Lake[1]	974	976.19	2.19	100.0%
Hillsdale Lake[1]	917	917.74	0.74	100.0%
Arkansas River Basin			**11/25/2019**	
Marion Reservoir[1]	1350.5	78,301	-0.37	97.1%
Council Grove Lake[1]	1274	44,471	0.17	100.0%
John Redmond Reservoir	1041	75,054	0.82	100.0%
Toronto Lake	901.5	17,826	0.58	100.0%
Fall River Lake	948.5	20,967	0.13	100.0%
Elk City Lake	796	37,975	0.15	100.0%
Big Hill Lake	858	23,474	0.10	100.0%
Cheney Reservoir	1421.6	162,608	-0.47	97.3%
El Dorado Lake	1339	156,725	-0.25	98.8%

[1]Lake level management plan in place — Source: U.S. Army Corps of Engineers, U.S. Bureau of Reclamation and U.S. Geological Survey

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.

In Figure 8 the blue bars indicate water in storage at that reservoir, with red bars indicate top of the flood pool storage. Some reservoirs have storage space remaining for flood flows but the available space varies.

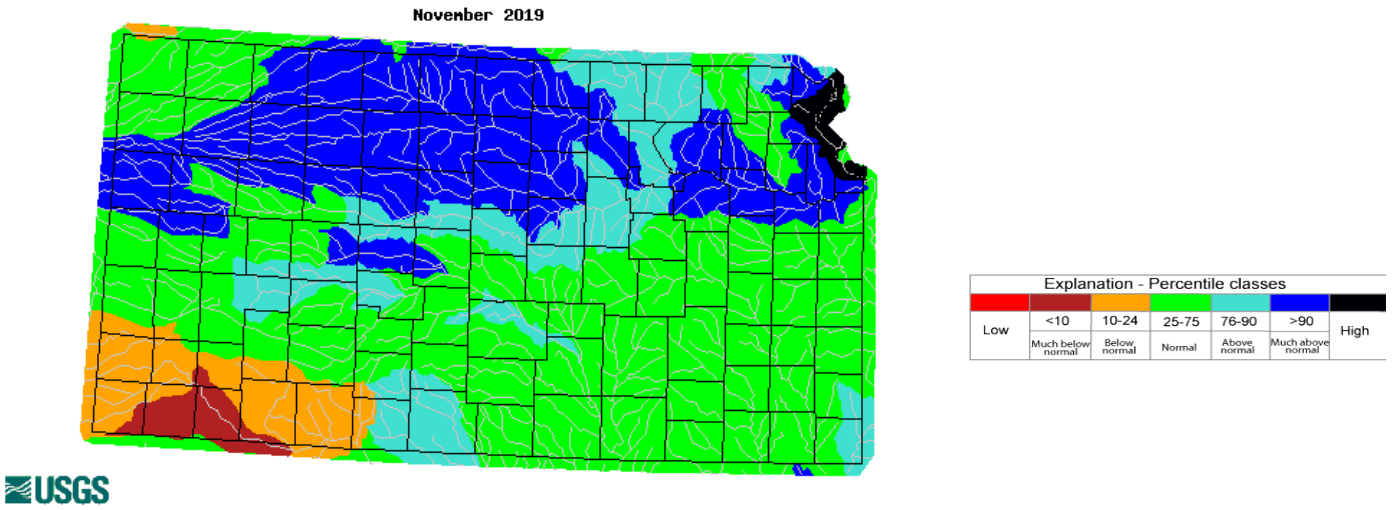
Figure 8. Reservoir Storage and Flood Pool Availability



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. 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. This comparison aids in evaluating water resources conditions for a time period. A summary of flooding in is found later in this report. Figure 9 summarizes streamflow.

Figure 9. Monthly streamflow compared to historical streamflow



Minimum Desirable Streamflow: Low flows may be reflected at gage locations when the flow does not reach Minimum Desirable Streamflow (MDS). MDS requirements are in place to ensure base flows in certain streams to protect existing water rights and to meet in-stream water uses related to water quality, fish and wildlife and recreation. The Kansas Department of Agriculture, Division of Water Resources monitors 23 streams and rivers at 33 locations for minimum desirable streamflow. When flows drop below an established threshold, pumping restrictions are imposed on permits or water rights granted after the minimum desirable streamflow provision was made into law in 1984.

Although no water right administration was in effect in this month, the table below notes locations of concern including those below MDS.

Table 4.
Streamflows of Note

Gaging Station	Nov 4 Flow	Nov 12 Flow	Nov 18 Flow	Nov 25 Flow	Nov MDS	Comment
Rattlesnake Creek near Macksville	4.89	4	4.59	4.59	5	No surface water diversions junior to MDS above gage
South Fork Ninnescah River near Pratt	11	11	11	11	10	No surface water diversions junior to MDS above gage

General flooding for the month is shown in the USGS WaterWatch maps in the streamflow section of this report. However this does not provide all the specifics of severity of impacts and duration at specific locations. Additional flooding information can be found for USGS stream gage sites at https://waterwatch.usgs.gov/?m=flood&r=ks&w=flood%2Ctable for current stage.

Lake Safety

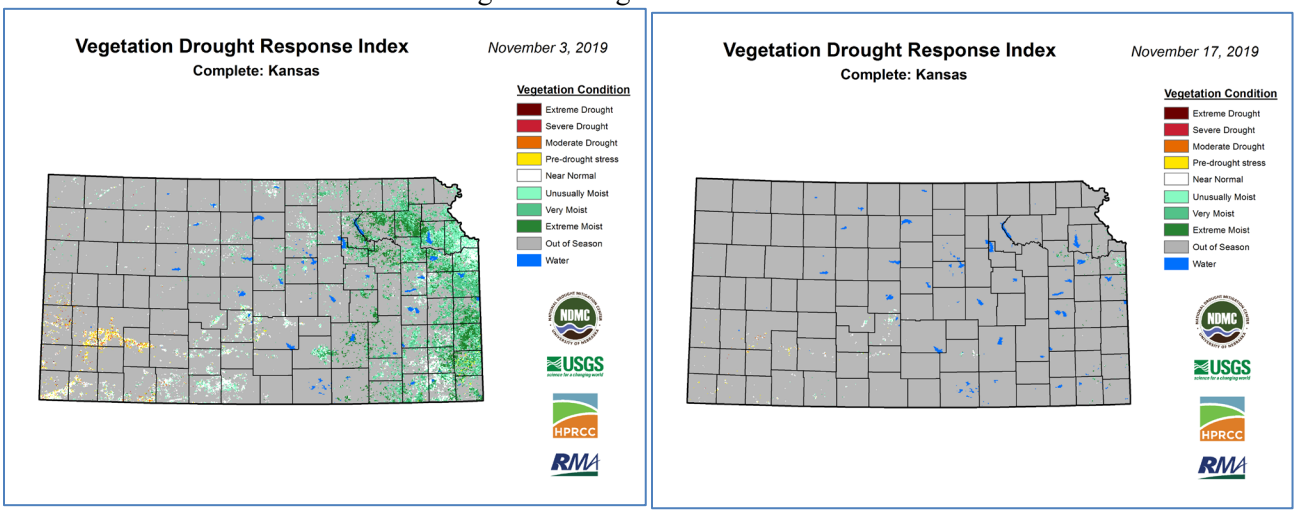
Harmful Blue-Green Algal Blooms (lake water safety)
KDHE samples public use lakes only in response to complaints of human or animal illness or visual sighting of possible blue-green algae by the public or lake officials. The season for harmful algal blooms (HABs) monitoring is April 1-October 31.

Lakes affected in the end of the season were Warnings for Elkhorn Lake, Jackson County; Jerry Ivey Pond, Saline County; Lake Jeanette, Leavenworth County; Lakewood Park Lake, Saline County and Watch for South Lake, Johnson County. More information can be found at http://www.kdheks.gov/algae-illness/index.htm.

Vegetation and Soil Moisture

Vegetative Conditions
The Vegetative Condition map depicts vegetation stress. It is produced using satellite data by the National Drought Mitigation Center https://vegdri.unl.edu/Home.aspx and often customized for Kansas by the Kansas Biological Survey in the GreenReport. Areas in yellow, orange and red indicate areas of vegetative stress. The green areas are considered to be in good or excellent condition (moist).

Figure 10. Vegetative Conditions

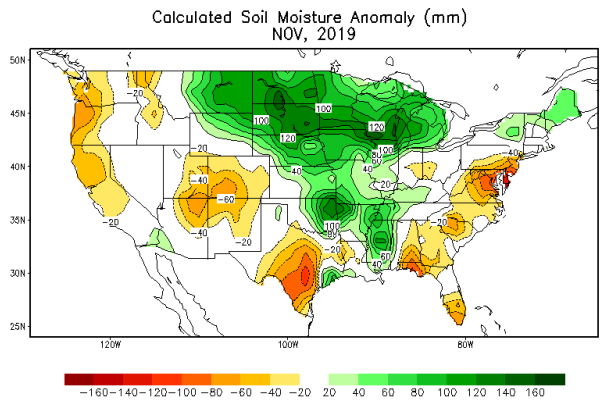


The Vegetation Drought Response Index (VegDRI) classified less than 1% of the land area as dry or in drought at the beginning of November, with 4% of Kansas near normal and 11% considered unusually, very or extremely moist. By mid-November the state was considered out of season for vegetation by the standards of this tool.

Soil Moisture and Rangeland

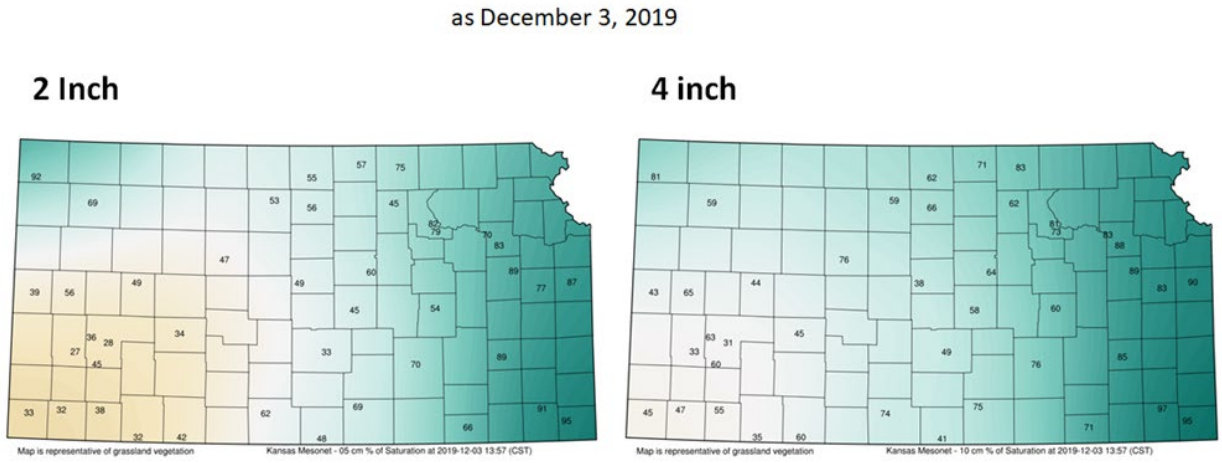
The Climate Prediction Center (CPC), monitors soil moisture and predicts future soil moisture. Anomalies are defined as deviations from the 1971-2000 monthly climatology. The monthly soil anomaly is shown in Figure 11. (.http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml).

Figure 11.



Within Kansas soil moisture is now being measured through the Kansas Mesonet and Kansas State University the percent of soil saturation (representative of grassland vegetation) is shown in Figure 12. (http://mesonet.k-state.edu/agriculture/soilmoist/)

Figure 12. Percent of Soil Saturation



The National Agricultural Statistics Service, USDA Crop Progress and Condition provides a summary of the climatic effects on soil and crops. For the week ending December 1, 2019, topsoil moisture supplies 9 percent very short, 31 short, 57 adequate, and 3 surplus. Subsoil moisture supplies rated 8 percent very short, 28 short, 60 adequate, and 4 surplus.

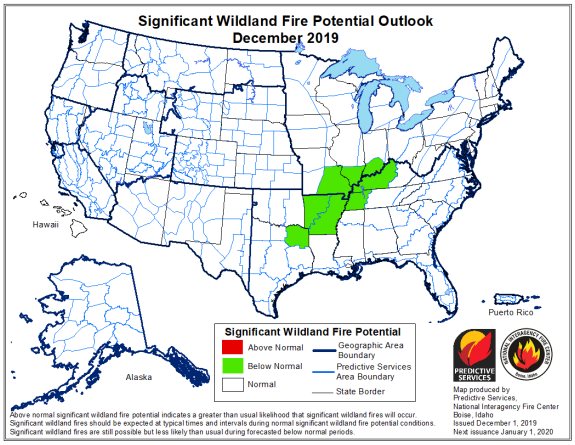
Field Crops Report:
Winter wheat condition rated 4 percent very poor, 12 poor, 38 fair, 39 good, and 7 excellent.
Pasture and range conditions rated 4 percent very poor, 10 poor, 29 fair, 51 good, and 6 excellent.

Fire

Fire activity increased in early November with grass fires in Cheyenne, Harvey, and Riley counties Nov. 3-13. The Cherry Creek Fire near St Francis. (Cheyenne Co) affected an estimated 10,000 acres.

The National Weather Service issues Red Flag Warnings when conditions favoring wildfire are at an increased risk. These are issued daily when needed. A Significant Wildland Fire Potential Outlook is issued monthly for the United States. Figure 13 is the most recent outlook for possible wildfires tor the next month. Additional forecasts can be found at https://www.predictiveservices.nifc.gov/outlooks/monthly_seasonal_outlook.pdf .

Figure 13. Wildfire Outlook



Disaster Designations

A total of 70 Kansas counties are now identified in Federal Emergency Declarations, DR-4449 due to storms, winds, tornadoes, flooding, landslides and mudslides. The President's action makes federal funding available to state, eligible local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and repair or replacement of facilities in Allen, Anderson, Atchison, Barber, Barton, Bourbon, Brown, Butler, Chase, Chautauqua, Cherokee, Clark, Clay, Cloud, Coffey, Comanche, Cowley, Crawford, Dickinson, Doniphan, Douglas, Edwards, Elk, Ellsworth, Ford, Franklin, Geary, Gray, Greenwood, Harper, Harvey, Hodgeman, Jefferson, Kingman, Leavenworth, Lincoln, Linn, Lyon, Marion, Marshall, McPherson, Meade, Miami, Montgomery, Morris, Nemaha, Neosho, Ness, Osage, Osbourne, Ottawa, Pawnee, Phillips, Pottawatomie, Pratt, Reno, Rice, Riley, Rush, Russell, Saline, Smith, Sumner, Wabaunsee, Wallace, Washington, Wilson, Woodson and Wyandotte counties.

Federal funding is also available on a cost-sharing basis for hazard mitigation measures statewide. Some additional counties may be eligible for federal declaration and aid in the future once damage assessment is completed by FEMA.

Producers in 57 counties may be eligible for agricultural emergency loans as USDA has designated 25 counties as primary agricultural disaster areas for crop year 2019 due to flooding or excessive rain. Primary counties are Allen, Anderson, Atchison, Barton, Bourbon, Chase, Chautauqua, Cherokee, Cowley, Doniphan, Franklin, Gove, Johnson, Labette, Leavenworth, Linn, Lyon, Miami, Montgomery, Neosho, Osage, Wallace, Wilson, Woodson, Wyandotte. Additional, contiguous counties are: Brown, Butler, Coffey, Crawford, Douglas, Elk, Ellsworth, Graham, Greeley, Greenwood, Jackson, Jefferson, Johnson, Lane, Linn, Logan, Marion, Miami, Morris, Ness, Pawnee, Rice, Rush, Russell, Scott, Sedgwick, Shawnee, Sheridan, Sherman, Stafford, Sumner, Thomas, Trego, Wabaunsee, and Wichita.

The Additional Supplemental Appropriations for Disaster Relief Act of 2019 was signed into law by President Trump on June 6, 2019. Congress appropriated $3.005 billion in assistance for a wide array of losses resulting from disasters throughout 2018 and 2019, including loses related to prevented planting of insured crops in calendar year 2019. In Kansas, WHIP+ is available only for crops affected by flooding, snowstorm, tornado and wildfires. Eligible crops are those in a Secretary or President-declared disaster county, or those with COC-accepted documentation of the qualifying disaster event.

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. Mary Knapp, at the Kansas Climate Office, Weather Data Library is the primary source of the narrative on weather. She works closely with meteorologists throughout the state and region. Details of current conditions at such as precipitation, temperature, evapotranspiration (ET), soil moisture and more are available at http://mesonet.k-state.edu/

RESOURCES and REFERENCES

Kansas climate data is provided by Kansas State University, Weather Data Library through the Kansas Mesonet. (http://www.ksre.k-state.edu/wdl/). Soil moisture data was added in 2018 (http://mesonet.k-state.edu/agriculture/soilmoist)

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/) has precipitation and temperature summary maps available for the state, region and nation.

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. (https://agriculture.ks.gov/divisions-programs/dwr/water-appropriation/minimum-desirable-streamflow.)

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 National Drought Mitigation Center also produces VegDRI maps which 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 Monthly and Seasonal Drought Outlooks, developed by the NOAA Climate Prediction Center, assess the likelihood for improvement, persistence or deterioration in drought conditions for areas currently experiencing drought as identified by the U.S. Drought Monitor. (http://www.cpc.ncep.noaa.gov/) Also see: http://www.noaa.gov/.

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
Monthly Weather Summary

November Summary

Station[1]	Precipitation (inches)			Temperature °F			
						Extreme (Date)	
	Total	Departure[2]	Percent Normal	Mean	Departure[2]	Highest	Lowest
West							
Burlington, CO	0.03	-0.56	5%	38.7	0.5	77 (9)	2 (12)
Dodge City	0.20	-0.56	26%	42.5	-0.6	79 (9)	4 (12)
Garden City	0.21	-0.34	38%	39.8	-1.9	78 (9)	-1 (12)
Goodland	0.75	0.04	106%	38.0	-1.0	77 (9)	3 (11)
Guymon, OK	0.41	-0.12	77%	43.8	-1.8	81 (9)	2 (12)
Hill City	0.62	-0.33	65%	39.7	-1.0	81 (9)	1 (12)
Lamar, CO	0.18	-0.20	47%	38.5	-1.5	77 (9)	2 (12)
McCook, NE	0.48	-0.47	51%	38.0	-0.2	82 (9)	0 (12)
Springfield, CO	0.34	-0.24	59%	39.6	-2.1	76 (9)	1 (12,11)
Central							
Concordia	0.56	-0.55	50%	42.2	0.6	78 (9)	6 (12)
Hebron, NE				39.4	0.0	76 (9)	2 (12)
Medicine Lodge	0.56	-0.37	60%	43.0	-2.4	76 (18)	4 (12)
Ponca City, OK	0.59	-1.22	33%	45.8	-1.9	75 (18)	12 (12)
Salina	0.61	-0.64	49%	41.3	-2.6	78 (9)	3 (12)
Wichita (ICT)	0.64	-0.79	45%	43.7	-1.7	74 (18)	8 (12)
East							
Bartlesville, OK	2.24	-0.44	84%	44.8	-3.2	76 (10)	13 (12)
Chanute	0.87	-1.63	35%	44.2	-2.1	71 (10)	11 (12)
Falls City, NE	0.55	-1.41	28%	39.2	-1.8	79 (9)	3 (12)
Johnson Co. Exec. Apt	1.17	-1.32	47%	40.6	-3.4	68 (20)	7 (12)
Joplin, MO	2.54	-1.24	67%	44.5	-3.9	73 (10)	11 (12)
Kansas City (MCI), MO	0.93	-1.22	43%	40.8	-2.8	68 (20)	8 (12)
St. Joseph, MO	0.35	-1.20	23%	39.1	-2.8	66 (20,9)	5 (12)
Topeka (TOP)	1.22	-0.63	66%	41.6	-2.2	73 (9)	8 (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