



K-STATE
Research and Extension

Extension Agronomy

eUpdate

01/08/2016

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, Agronomy e-Update Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Steve Watson, 785-532-7105 swatson@ksu.edu, Jim Shroyer, Crop Production Specialist 785-532-0397 jshroyer@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Conventional soybean varieties for Kansas: Supply and performance

Although Roundup Ready varieties continue to dominate the soybean market, new varieties of conventional, non-GMO soybeans are still being developed and marketed. There are several reasons why some producers are interested in conventional varieties, including:

1. Seed is less expensive than seed of Roundup Ready varieties.
2. It may be possible to replant seed of conventional varieties, subject to licensing agreements.
3. Some buyers are willing to pay a premium for non-GMO soybeans.

Whatever the reason, conventional soybean varieties are available but may take some effort to locate. K-State has several conventional soybean varieties under production including: KS4313N, KS4607, KS4910sp, KS5004N, and KS5005sp. KS4313N (maturity group 4) and KS5004N (maturity group 5) are high-yielding varieties for the commodity market. The other K-lines are special purpose (large seed, high protein) varieties better suited to identity-preserved markets. K-State is also working towards the release of a new maturity group 4, conventional, STS-resistant soybean variety this year.

The seed source for the K-State releases would be the private seed companies that have licensed each particular variety. To find out which seed producers currently have licenses for these varieties, contact K-State Foundation Seed at 785-532-6115, <http://www.agronomy.k-state.edu/services/ks-foundation-seed/>

Producers interested in producing seed to be sold or used for planting, or interested in new releases should also contact the K-State Foundation Seed program. Depending upon the variety grown, producers may need to sign a license agreement which specifies how the varieties can be used and whether a royalty is owed to K-State.

Perhaps the first place to inquire about seed of conventional varieties would be your current seed supplier. In addition to the option of calling K-State Foundation Seed for information about seed producers who have a license for K-State releases, here are a few public or private contacts that develop or sell maturity groups 3, 4, or 5 conventional soybean varieties:

Iowa State University
www.cad.iastate.edu
515-294-5045

Missouri public varieties
www.moseed.org
573-449-0586

University of Arkansas Foundation Seed
870-673-5045

University of Nebraska
www.huskergenetics.unl.edu
402-624-8020

DeLange Seed
Girard, Kansas
www.delangeseed.com
800-962-5429

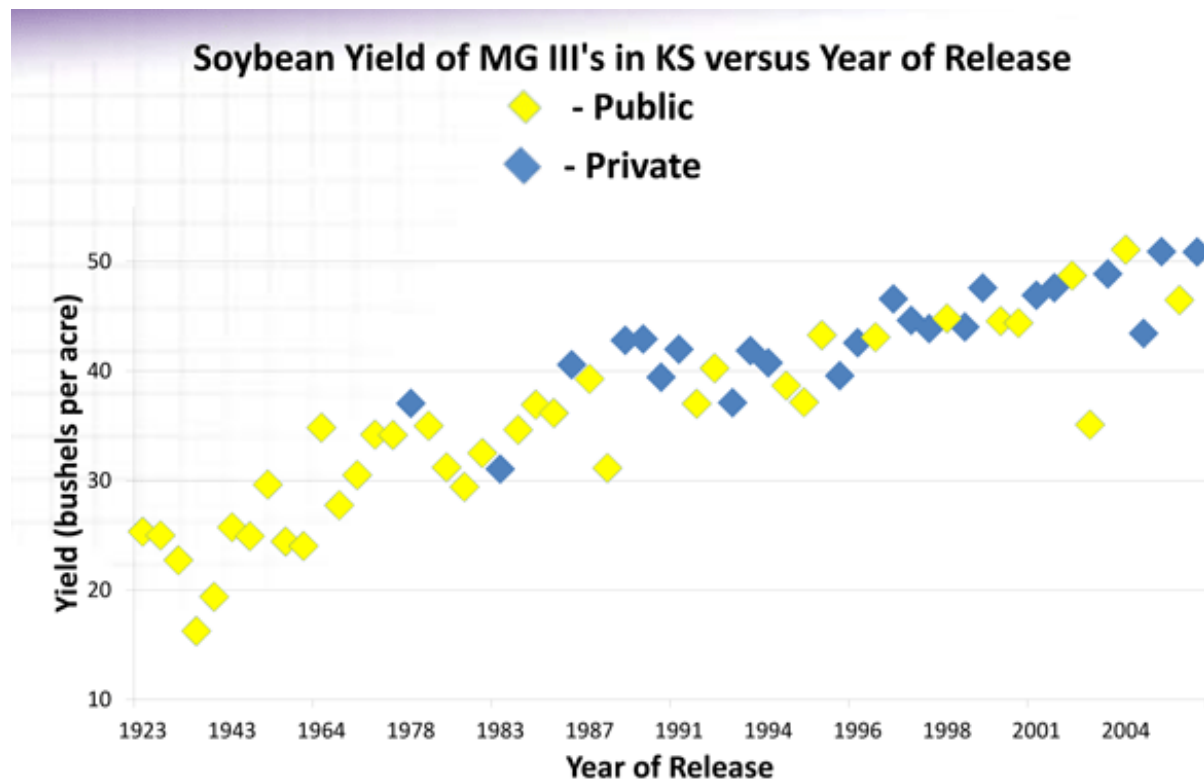
Emerge Genetics
West Des Moines, Iowa
www.emergegenetics.com
515-314-1003

NeCo Seed
Garden City, Missouri
www.necoseed.com
816-862-8203

Taylor Seed Farms
White Cloud, Kansas
www.taylorseedfarms.com
800-742-7473

Many of these varieties would be available to producers for seed production under a licensing agreement. Some would not come with a license.

An examination of soybean yield trends in Kansas of maturity group 3 varieties released since 1923 showed yield increases of both public and private varieties over time (see graph below). Most of the public entries in these trials were conventional varieties.



To better evaluate variety adaptation for specific locations, K-State and other Midwestern universities do include some conventional soybean varieties in their state soybean performance tests. Most of these tests, including those at K-State, use a few Roundup Ready check varieties at each location for comparison purposes. A few states simply include conventional varieties with the entire group of Roundup Ready or Liberty Link varieties entered in the tests. Other states that have included conventional varieties in their soybean performance tests include Missouri, Arkansas, and Iowa.

Yield results of the 2015 K-State Conventional Soybean Performance Tests are in the table below.

2015 K-State Conventional Soybean Performance Tests						
Yield (bu/acre)						
Brand	Entry	Franklin Co. MG III-IV	Franklin Co. MG IV-V	Labette Co. MG III-IV	Labette Co. MG IV-V	Republic Co.
Roundup Ready checks						
Asgrow	AG3432	55	--	59	--	64
Asgrow	AG4232	58	--	60	--	56
Asgrow	AG5335	--	58	--	56	--
Kansas AES	K4313NRR	--	--	--	--	60
Pioneer	P35T58R	--	--	56	--	67
Pioneer	P39T67R	--	--	58	--	58
Pioneer	49T80R	--	63	--	56	--
Conventional varieties						
Arkansas	Osage	--	58	--	58	--
Arkansas	R09-1589	--	50	--	50	--
Arkansas	R09-430	--	59	--	60	--
Arkansas	UA 5014C	--	56	--	55	--
Arkansas	UA 5213C	--	50	--	61	--
Arkansas	UA 5612C	--	44	--	51	--
Arkansas	UA 5814HP	--	36	--	50	--
Emerge Genetics	e3692s	51	--	57	--	59
Emerge Genetics	e4310s	53	--	55	--	50
Emerge Genetics	e4993s	--	--	--	60	--
Emerge Genetics	e5110	--	--	--	56	--
Iowa AES	IA3023	51	--	47	--	64
Iowa AES	IA4004	53	--	47	--	64
Kansas AES	K10-8556	51	--	51	--	64
Kansas AES	K11-2363B	56	--	60	--	66

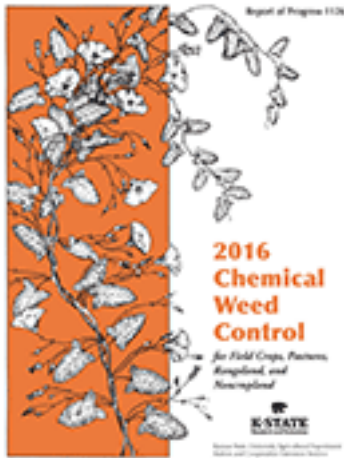
Kansas AES	K11-2363T	56	--	58	--	66	
Kansas AES	K12-1348	--	--	--	56	--	
Kansas AES	K12-1355	--	--	--	48	--	
Kansas AES	K12-1575	54	--	52	--	66	
Kansas AES	K12-2333	55	--	62	--	56	
Kansas AES	KS5004N	--	--	--	53	--	
Kansas AES	KS5502N	--	--	--	53	--	
LSD (0.10)		5	5.5	3	4	7	

While the number of conventional varieties is limited, with some investigation, it is possible for a producer to find a seed source of a conventional soybean variety that should be competitive in performance in Kansas environments.

-- Bill Schapaugh, Soybean Breeder
wts@ksu.edu

2. New 2016 K-State Chemical Weed Control guide now available

The new K-State *2016 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland* guide, SRP 1126, is now available. Hard copies will be available soon at selected K-State Extension meetings and in County/District Extension offices. A PDF version can be found at: <http://www.bookstore.ksre.ksu.edu/pubs/chemweedguide.pdf>



Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist
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3. K-State Corn Production Management Schools scheduled for early January



Three K-State Corn Production Management Schools will be offered in early January 2016 in southeast, southwest, and central Kansas. Each school will provide in-depth training targeted for corn producers. Primary sponsors of the schools include the Kansas Corn Commission and DuPont Pioneer.

The one-day schools will cover several current corn topics relevant to corn producers in Kansas: drought-tolerant hybrids, high-yielding corn factors, weed control, soil fertility, and price and market perspectives.

Typical agenda:

8:45 a.m. - Registration and Introductions

9:00 a.m. - Program starts

Noon - Lunch/ Kansas Corn Commission Update

2 or 2:30 p.m. (depending on the location) - Program Ends

Highlighted Presentation* or Tour**

* Presentation for Independence: N. Barkley, VP of Coffeyville Resources Nitrogen Operations

** Tour for Garden City: Conestoga Energy's "Bonanza Bio Energy" Plant

<http://www.conestogaenergy.com/bonanza-bioenergy>

** Tour for Salina: Great Plains Manufacturing, <http://www.greatplainsmfg.com>

All the Schools will offer CEU (Certified Crop Advisor) and Commercial Pesticide Applicators credits.

The dates and locations are:

Jan. 11: **Independence:** Civic Center. N Penn Ave & W Locust St

Local Research and Extension office contacts:

- Jeri Geren, Montgomery County- Wildcat District, jlsigle@ksu.edu, 620-331-2690
- Josh Coltrain, Crawford County- Wildcat District, jcoltrain@ksu.edu, 620-724-8233
- Keith Martin, Labette County- Wildcat District, rkmartin@ksu.edu, 620-784-5337
- Dale Helwig, Cherokee County, dhelwig@ksu.edu, 620-429-3849
- Chris Petty, Bourbon County- Southwind District, cgp@ksu.edu, 620-223-3720

Jan. 14: **Garden City:** Clarion Inn, 1911 E Kansas Ave, Garden City, KS 67848

Local Research and Extension office contacts:

- Katelyn Barthol, Finney County, kbarth25@ksu.edu, 620-272-3670
- Andrea Burns, Ford County, aburns@ksu.edu, 620-227-4542
- Kurt Werth, Grey County, kwerth@ksu.edu, 620-855-3821
- Lacey Noterman, Haskell County, lnoter@ksu.edu, 620-675-2261
- Bill Haney, Kearny County, haney@ksu.edu, 620-355-6551
- John Beckman, Scott County, jbeckman@ksu.edu, 620-872-2930

Jan. 15: **Salina:** Great Plains Manufacturing, 1525 E North St

Local Research and Extension office contacts:

- Tom Maxwell, Central Kansas District, tmaxwell@ksu.edu, 785-309-5850
- Jonie James, McPherson County, jjames@ksu.edu, 620-241-1523
- James Coover, Dickinson County, jcoover@ksu.edu, 785-263-2001
- Michelle Buchanan, Midway District, mbuchanan@ksu.edu, 785-472-4442
- Kim Larson, River Valley District, kclarson@ksu.edu, 785-243-8185

Lunch will be provided, courtesy of the sponsors. There is no cost to attend, but participants are asked to pre-register before Jan. 8.

Online registration is available at K-State Corn Schools: <http://bit.ly/KSCORNSchools>

You can also register by emailing or calling the nearest local Research and Extension office for the location you plan to attend.

For more information, contact:

Greg Krissek, CEO Kansas Corn
gkrissek@ksgrains.com, 785-448-6922

Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu, 785-532-6940

Lucas Haag, Northwest Area Crops and Soils Specialist
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AJ Foster, Southwest Area Crops and Soils Specialist
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Stu Duncan, Northeast Area Crops and Soils Specialist
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Doug Shoup, Southeast Area Crops and Soils Specialist
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4. Cover Your Acres Conference, January 19-20 in Oberlin

K-State Research and Extension is teaming up with the Northwest Kansas Crop Residue Alliance to host the 13th annual Cover Your Acres Winter Conference for crop producers and consultants Jan. 19-20 at the Gateway Center in Oberlin, Kansas. The same program will be offered both days of the conference.

Cover Your Acres is a producer-driven meeting focused on new ideas and research-based updates in crop production in northwest Kansas and the central High Plains region.

The conference, which typically draws more than 600 attendees from Kansas and other states, highlights the latest technology, methods and conservation practices to improve crop production in the region. This year it will feature university specialists and industry representatives discussing issues such as kochia and palmer amaranth control, soil microbiology, new pests in wheat and sorghum, farm profitability, managing soil pH, UAVs, weather forecasting, the economics of fertility management, and an economic comparison of today's farms to those of the 1980's. The same programs will be offered both days of the conference. Registration will begin at 7:45 a.m., with educational sessions ending at 5:00 p.m. followed by a "bull session" on Tuesday evening, where attendees can visit with industry and university specialists.

Early registration is due by Jan. 13. The fee is \$40 for Jan. 19, \$35 for Jan. 20 or both days for \$50. After Jan. 14, the cost is \$50 per day. The conference fee includes lunch and educational materials. Continuing education unit credits are available for commercial applicators and certified crop advisors.

Mail your registration, with a check payable to KSU, to the Northwest Area Office, ATTN: Cover Your Acres, P.O. Box 786, Colby, KS 67701. To view the conference details and for online registration, visit www.northwest.ksu.edu/coveryouracres. For questions, call 785-462-6281.

Major sponsors of the conference include Bayer CropScience, EGE Products, Hoxie Implement, Lang Diesel, National Sunflower Association, PacLeader Technology, Plains Equipment Group, Sims Fertilizer, and Surefire Ag Systems.

Lucas Haag, Northwest Area Crops and Soils Specialist
lhaag@ksu.edu

5. Kansas Agricultural Technologies Conference, January 21-22 in Junction City

The 19th Annual Kansas Agricultural Technologies (KARTA) Conference will be held January 21-22, 2016 in Junction City at the Geary County Convention Center / Marriott, 310 Hammons Dr.

This annual event brings hundreds of agricultural producers and industry leaders together for a two-day interactive workshop on the ever-changing precision agriculture industry. There will be presentations on a wide variety of topics dealing with precision agriculture. The two-day event also includes vendor displays, the KARTA Annual Meeting, research presentations from grant recipients, and an interactive evening discussion that is always an attendee favorite.

The conference is co-sponsored by K-State Research and Extension and the Kansas Agricultural Research and Technology Association, whose members are producers, university researchers, and industry professionals focused on learning about agricultural production and technological and informational changes on today's farms.

There is a fee for this conference, and you must register. More information, including online registration is available at www.KARTA-online.org. Information is also available by contacting Lucas Haag, K-State Research and Extension Northwest Area Crops and Soil Specialist, at 785-462-6281 or lhaag@ksu.edu.

Lucas Haag, Northwest Area Crops and Soils Specialist
lhaag@ksu.edu

6. Canola College 2016 in Enid, February 19

Canola College 2016, "Taking Canola Production to the Next Level," will be held February 18, 2016 at the Chisholm Trail EXPO Center, 111 W. Purdue, in Enid, Oklahoma. This conference is sponsored by K-State, Oklahoma State University, Great Plains Canola Association (GPCA), and partners from the canola industry.

This will be the premier canola education/training event in the region in 2016. Canola College 2016 is for anyone with an interest in the canola industry, including experienced and first time growers, crop insurance agents, members of agricultural governmental agencies, and canola industry service and product providers. Attendees will hear from canola experts on a variety of key topics and will have the opportunity to visit with industry members who provide the goods and services needed to produce, handle, and market the crop.

Canola College 2016 topics will include:

Variety Selection – Mike Stamm, K-State Canola Breeder

Environmental and Cultural Impacts on Variety Selection - Heath Sanders, Canola Field Specialist, GPCA

Advanced Production Practices – Bob Schrock, Grower, Kiowa, Kan. and Jeff Scott, Grower, Pond Creek, Okla.

Managing Canola in Conventional and Conservation Tillage Systems – Jason Warren, OSU Extension Soil Management Specialist and Josh Bushong, OSU Canola Extension Assistant

Canola Production in Oklahoma Cropping Systems- Josh Lofton, OSU Cropping Systems Extension Specialist

Impact of Winter Wheat Stubble on Canola Establishment – Angela Post, OSU Extension Weed Specialist

In Season Nutrient Management for Canola Production – Brian Arnall, OSU Extension Soil Fertility Specialist

In Season Risk Management for Canola Production – Josh Lofton, OSU Cropping Systems Extension Specialist and Katie McCauley, OSU PaSS M.S. Candidate

Disease Management – John Damicone, OSU Extension Plant Pathologist

Insect Management – Tom Royer, OSU Extension Entomologist

New for 2016 will be the Canola Learning Laboratory. Attendees will be able to attend a learning laboratory where many of the concepts and theories presented throughout the conference will be on display through hands-on demonstrations. Participants will interact with specialists, get specific questions answered, and learn about the demonstrated concepts. Individual stations will focus on critical topics, such as: nutrient deficiency identification, herbicide uptake, weed/disease/insect identification, plant physiological changes with management practice, and winter survival.

Individuals can register for Canola College 2016 at www.canola.okstate.edu

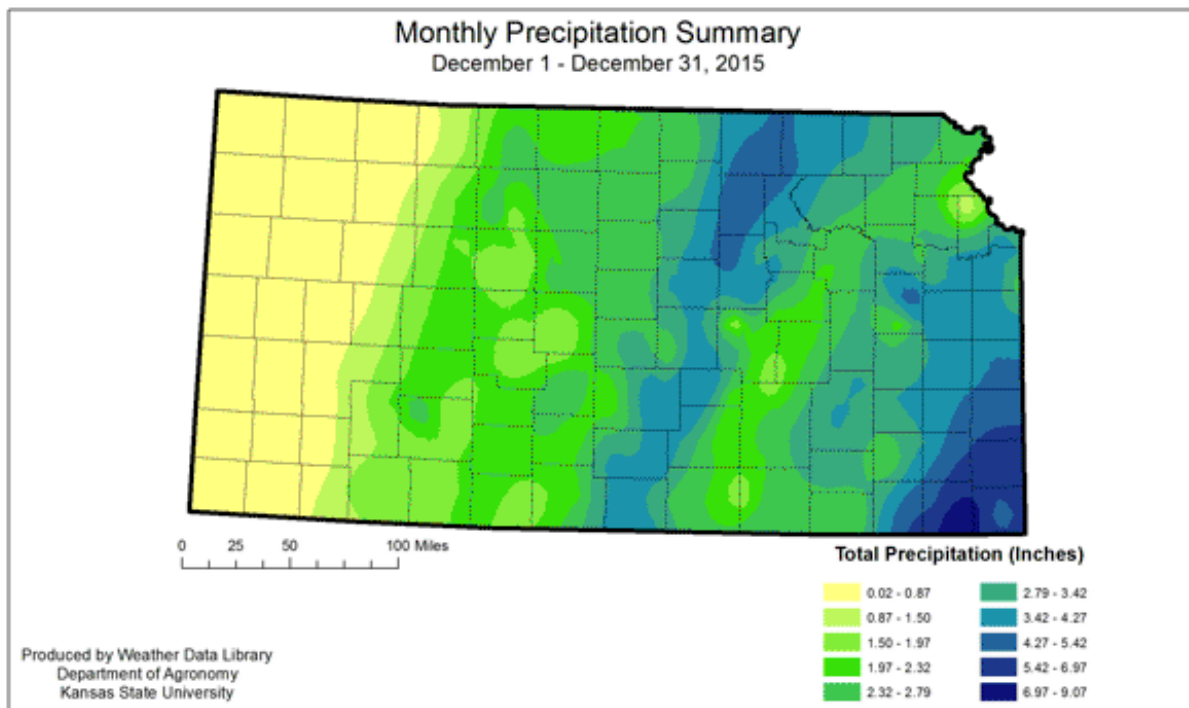
For more information on Canola College, contact Ron Sholar, Executive Director, GPCA, at Jrsholar@aol.com or Josh Lofton, Extension Cropping Systems Specialist, OSU, at josh.lofton@okstate.edu

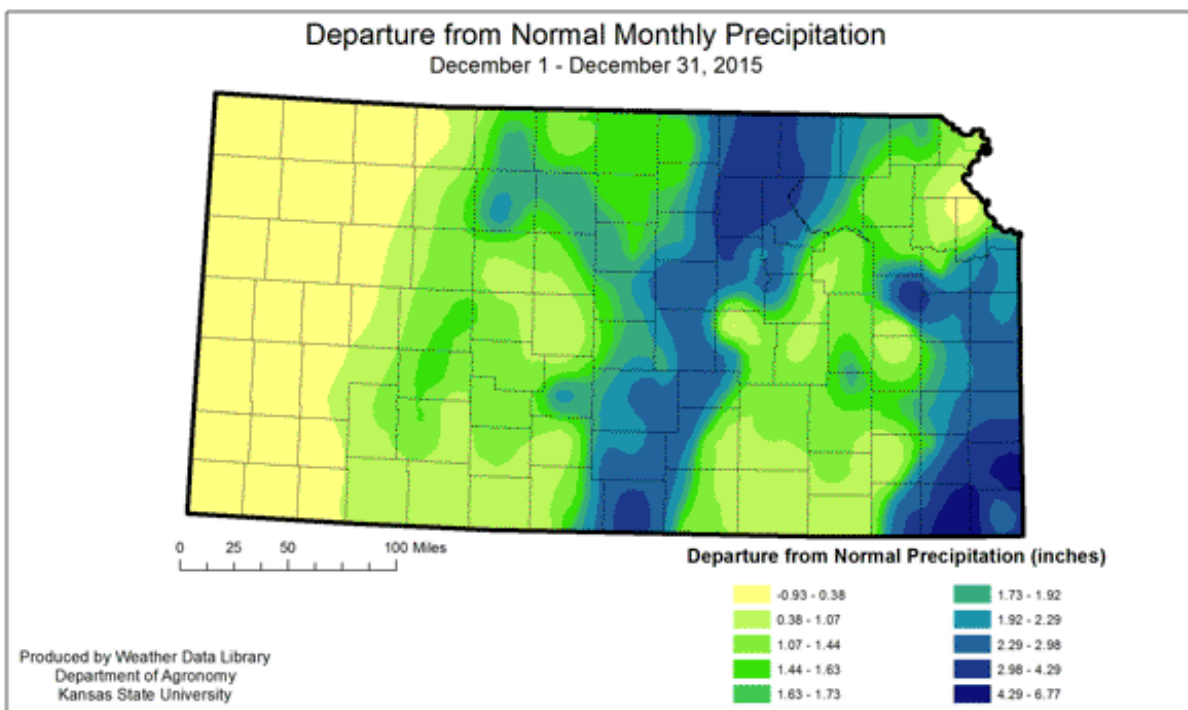
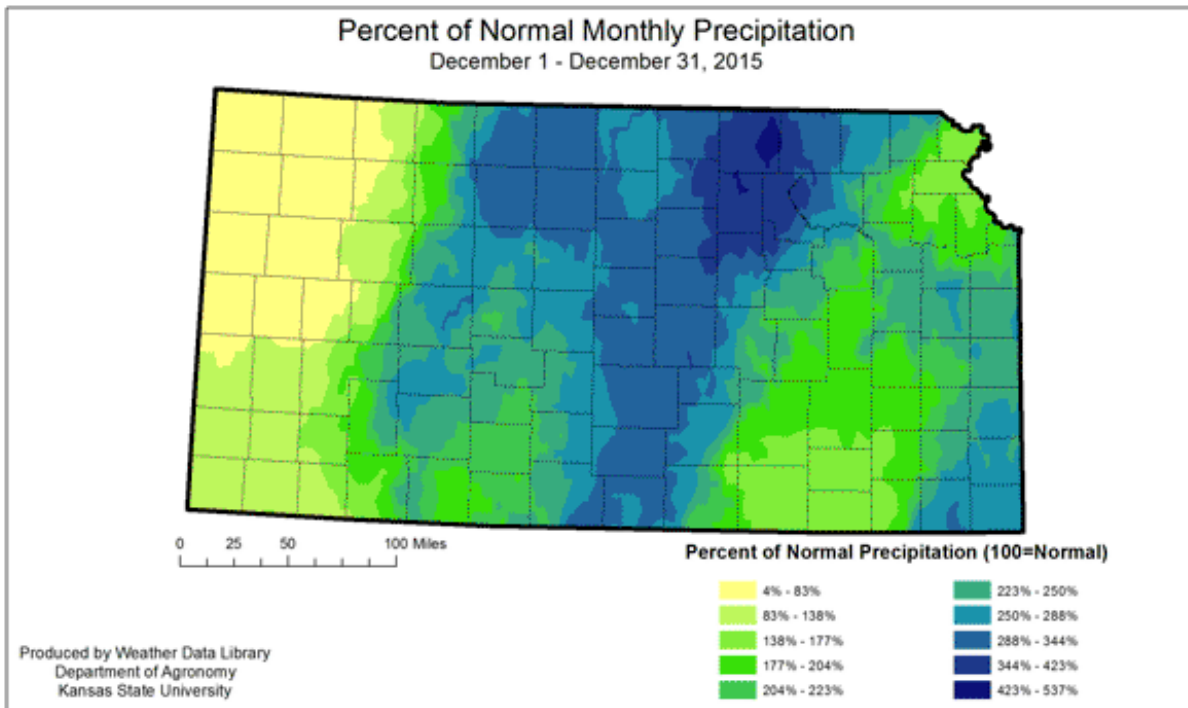
Mike Stamm, Canola Breeder
mjstamm@ksu.edu

7. December 2015 weather in Kansas: Wet and warm

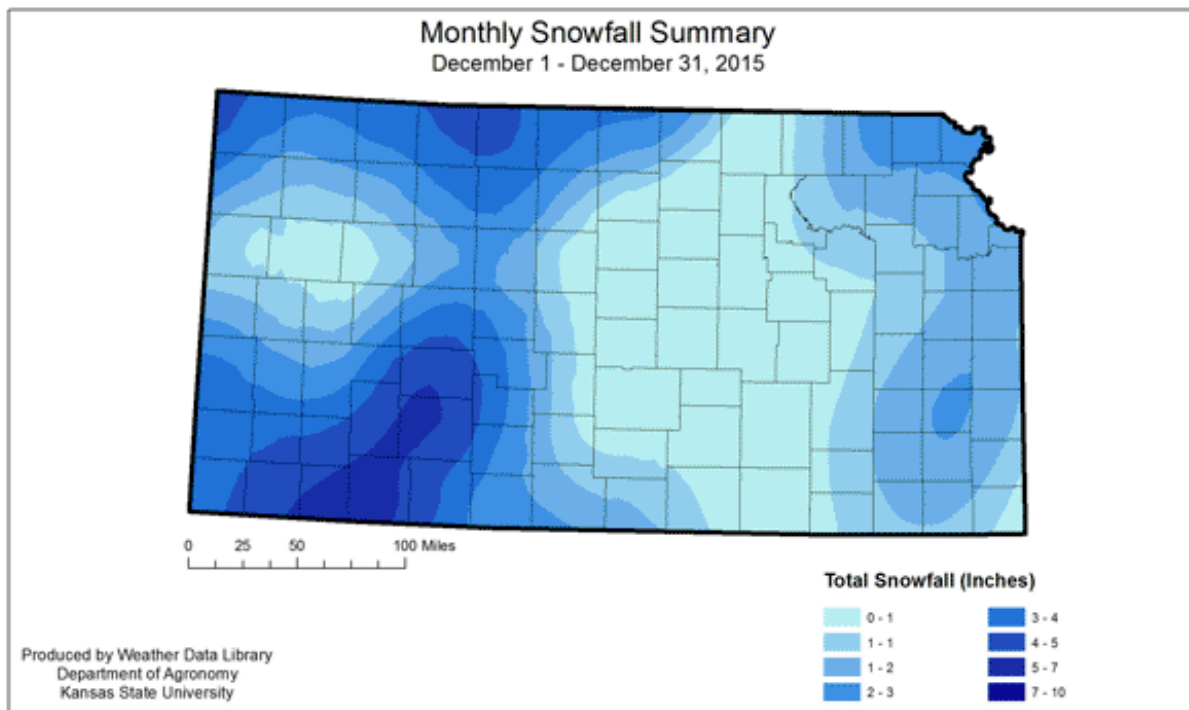
The overall pattern for December 2015 in Kansas was much wetter- and warmer-than-normal conditions. Statewide average precipitation was 2.28 inches. This ranks as the 6th wettest December since 1895. The Northwest Division was the exception to this wet pattern. The Northwest Divisional average was 0.50 inches, or 80 percent of the normal. In contrast, the West Central Division averaged 2.61 inches of precipitation, which was 289 percent of normal.

There were 210 new daily record precipitation amounts. In addition, 37 of those were new daily records for December. The bulk of these records occurred during the December 13-14th event, while a second wave came during a December 27th event. Not surprisingly, there were multiple reports of flooding and flash flooding with both events. The December 27th event was complicated by colder temperatures and freezing rain. The greatest daily precipitation totals were 3.43 inches at Pittsburg, Crawford County on the 27th (NWS) and 4.25 inches at Abilene, Dickinson County, on the 14th (CoCoRaHS). The greatest totals for the month were 9.07 inches at Bartlett, Labette County (NWS) and 8.00 inches at Pittsburg, Crawford County (CoCoRaHS).



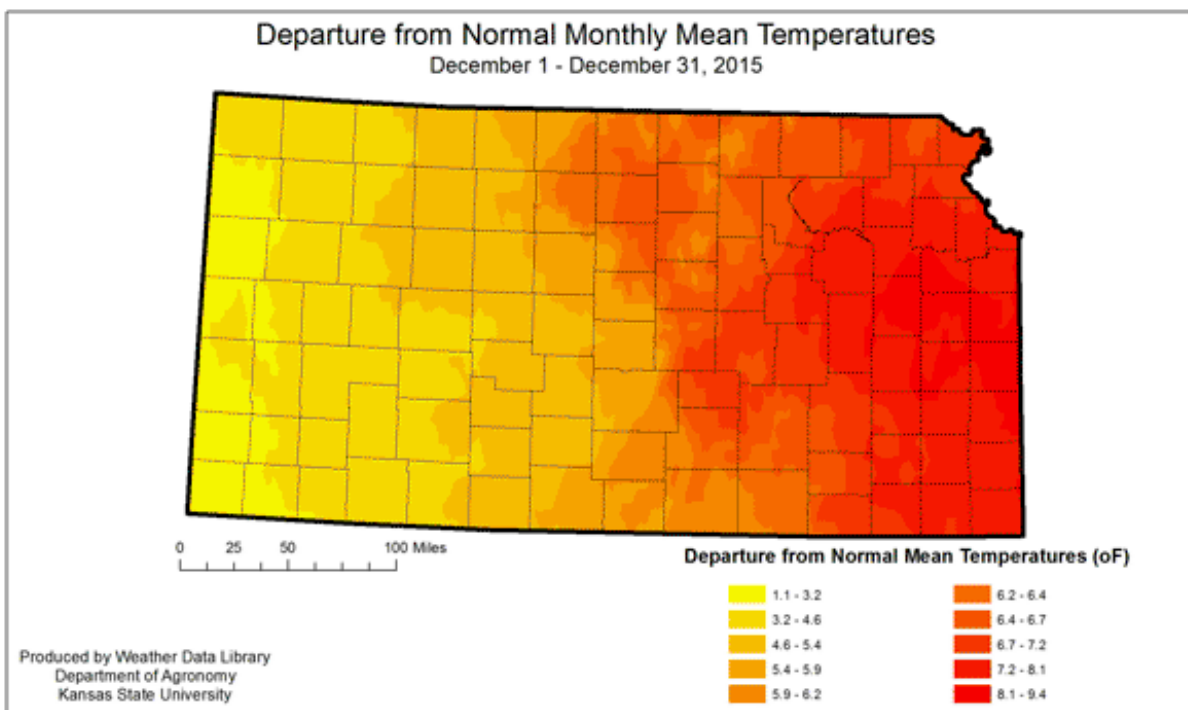
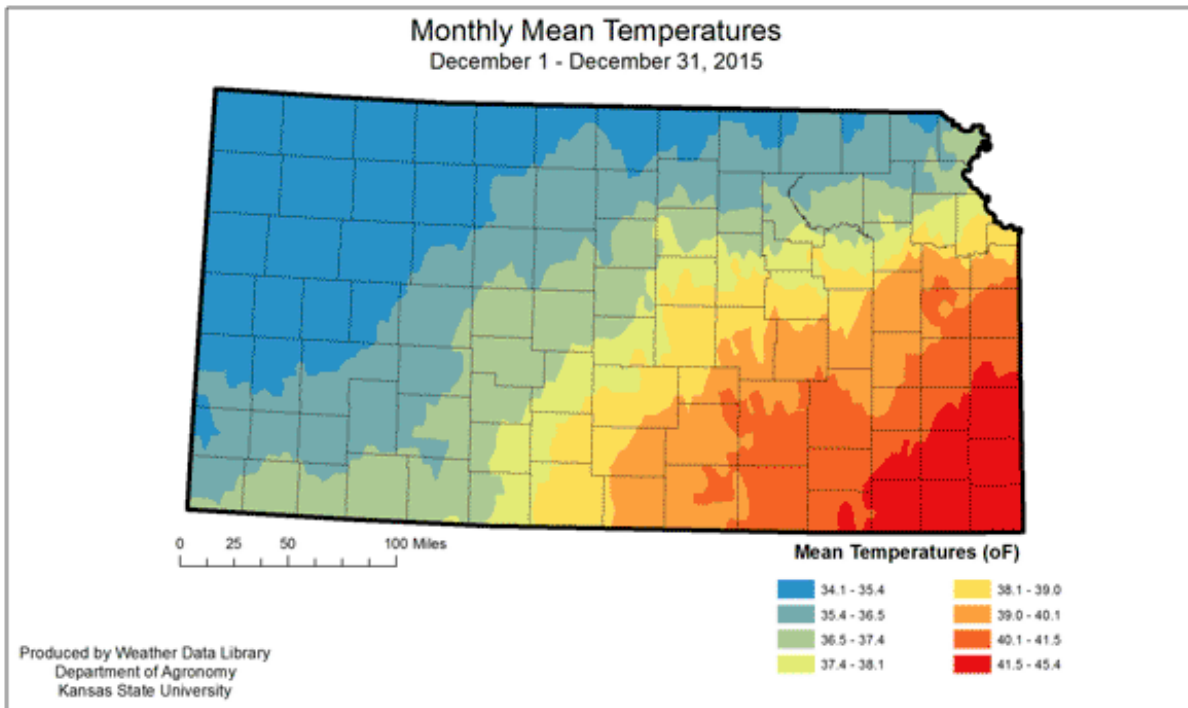


Despite the warmer-than-normal temperatures, snow was a feature during the month. The greatest 24 hour total was 9 inches at Jetmore, Hodgeman County, on the 14th. That was also the greatest monthly total for the state.



Along with being the 6th wettest December on record, this was the 4th warmest December on record as well. The statewide average temperature was 37.7 degrees F, or 5.6 degrees warmer than normal. The western divisions were the closest to normal, with departures ranging from +3.6 degrees F in the West Central Division to +3.8 degrees F in the Southwest Division. The East Central Division had the greatest departure from normal, with an average of 38.6 degrees F, or 7.4 degrees warmer than normal. There were 79 new daily high maximum temperature records set, although none of these were record highs for the month. In addition, 95 record warm minimum temperatures were recorded. One, 62 degrees F recorded at Independence on the 13th, was a new record warm minimum for December. The warmest reading for the month was 75 degrees F at Wilmore (Comanche County) on the 10th. The coldest reading was 3 degrees F, recorded at both Tribune (Greeley County) and St. Francis (Cheyenne County) on the 18th.

Severe weather was mainly in the form of heavy rain and flooding. As noted earlier, there was an icing event on the 27th and 28th of December. This was the second major ice event of the winter.



Drought conditions continue to improve. Moderate drought conditions were eliminated, and the area of abnormal dry conditions greatly reduced. Pockets of abnormally dry conditions remain in parts of central Kansas, as well as parts northwest Kansas. Some long-term hydrological deficits are in place affecting some water supplies and reservoirs. The drought outlook is for improving conditions,

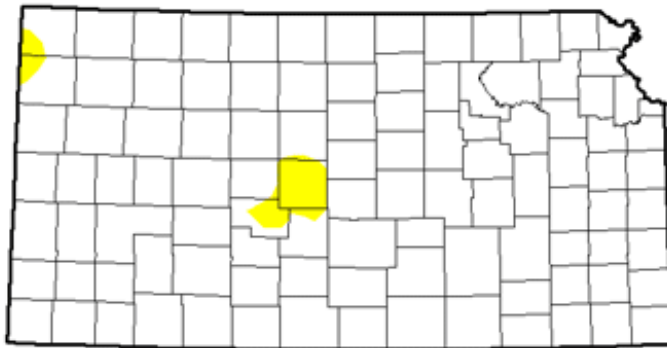
and the precipitation outlook for January is neutral. However, we are in a drier period of the year, so either above- or below-normal precipitation will be slow to show impacts.

U.S. Drought Monitor Kansas

December 29, 2015

(Released Thursday, Dec. 31, 2015)

Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	97.84	2.16	0.00	0.00	0.00	0.00
Last Week 12/22/2015	95.01	4.99	0.00	0.00	0.00	0.00
3 Months Ago 09/29/2015	80.79	14.72	4.48	0.00	0.00	0.00
Start of Calendar Year 12/01/2014	19.49	43.02	19.18	16.05	2.25	0.00
Start of Winter Year 09/29/2015	80.79	14.72	4.48	0.00	0.00	0.00
One Year Ago 12/01/2014	19.49	43.02	19.18	16.05	2.25	0.00

Author:
Chris Fenimore
NOAA/NESDIS/NCEI



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

Intensity

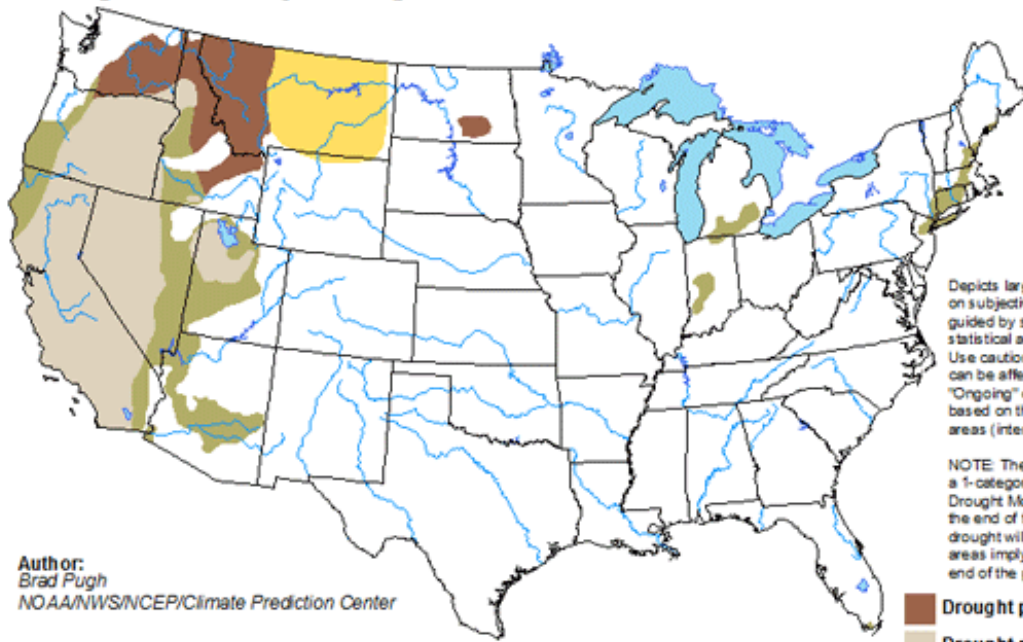
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

U.S. Seasonal Drought Outlook

Drought Tendency During the Valid Period

Valid for December 17 - March 31, 2016
Released December 17, 2015



Author:
Brad Pugh
NOAA/NWS/NCEP/Climate Prediction Center

Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely



<http://go.usa.gov/3eZ73>

Dec 2015

Kansas Climate Division Summary

Precipitation (inches)			Temperature (°F)			
Dec 2015		2015 Jan. through Dec.		Monthly Extremes		
Division Total	Dep. ¹ %	Total	Dep. ¹ %	Ave	Dep. ¹ Max Min	

Kansas State University Department of Agronomy

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			Normal		Normal					
Northwest	0.50	-0.07	80	20.83	-0.53	97	32.8	3.7	73	3
West Central	2.61	1.73	289	27.50	-0.51	96	34.2	3.6	72	3
Southwest	2.93	1.71	248	38.52	3.52	109	36.5	3.8	74	8
North Central	0.78	0.15	109	21.67	0.90	103	35.6	6.3	72	10
Central	2.66	1.73	284	28.51	-0.78	96	37.3	5.9	73	9
South Central	2.84	1.44	197	37.53	-0.39	97	39.4	6.1	75	9
Northeast	1.19	0.52	171	28.23	8.33	141	36.3	6.5	67	10
East Central	2.47	1.35	220	34.92	3.60	111	38.9	7.4	70	15
Southeast	3.83	2.01	203	41.16	-0.33	98	41.2	7.1	72	12
STATE	2.22	1.19	200	31.16	1.78	106	36.9	5.6	75	.

1. Departure from 1981-2010 normal value
2. State Highest temperature: 75 degrees F at Wilmore (Comanche County) on the 10th.
3. State Lowest temperature: 3 degrees F at Tribune1W (Greeley County) and St. Francis (Cheyenne County) on the 18th.
4. Greatest 24hr rainfall: 3.43 inches at Pittsburg, Crawford County on the 27th (NWS); 4.25 inches at Abilene 12.7 S, Dickinson County, on the 14th (CoCoRaHS).

Source: KSU Weather Data Library

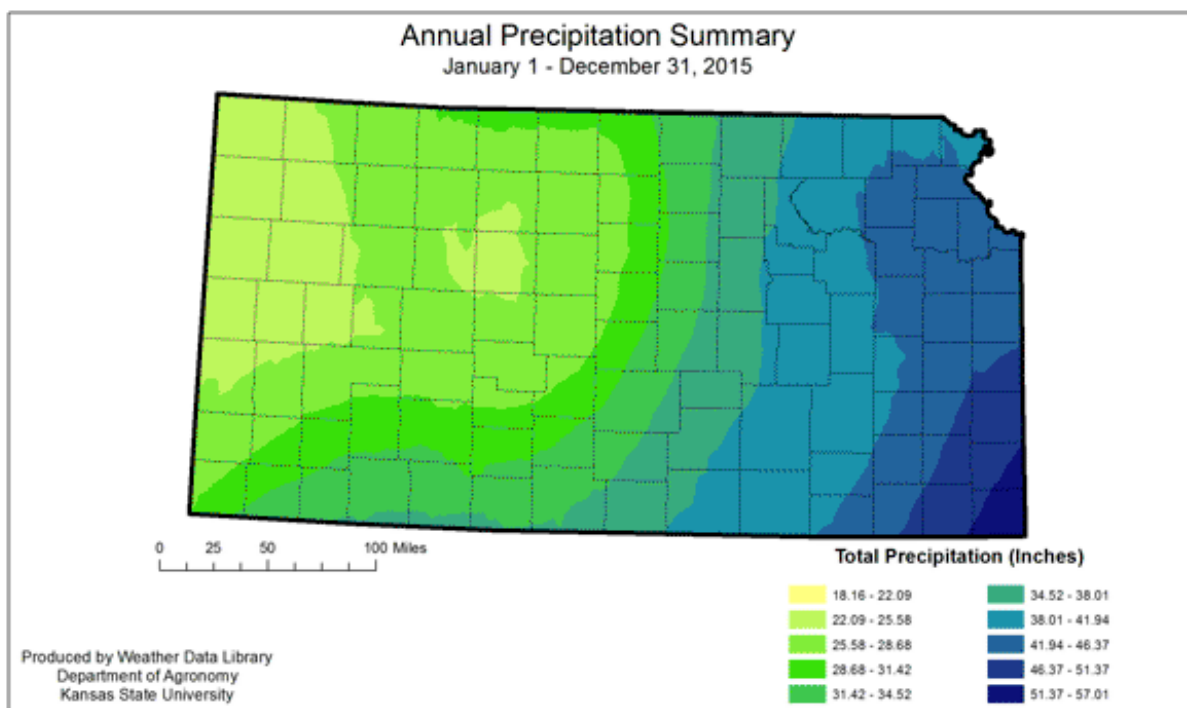
Mary Knapp, Weather Data Library

mknapp@ksu.edu

8. Annual 2015 weather summary for Kansas: Warm and wet

At the start of 2015, more than 80 percent of the state was in some form of drought, with almost 2 percent in extreme drought. By the end of the year, that had switched to almost 98 percent of the state being drought-free. The year ranked as the 15th wettest since 1895. The reversal took most of the year. Statewide average precipitation was below normal for the first 3 months, but switched to a wetter pattern in April. By May, only the Northwest and North Central Divisions were below average for the year-to-date. The Southwest Division averaged 7.73 inches, more than 2 ½ times the normal for May.

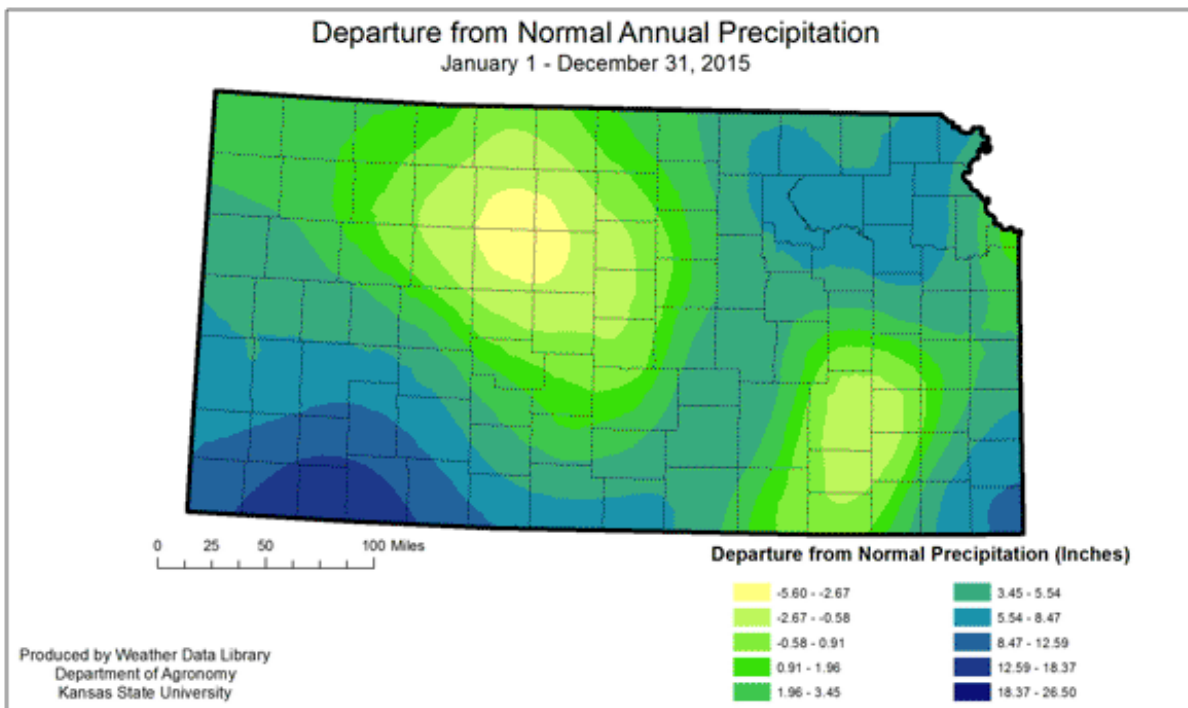
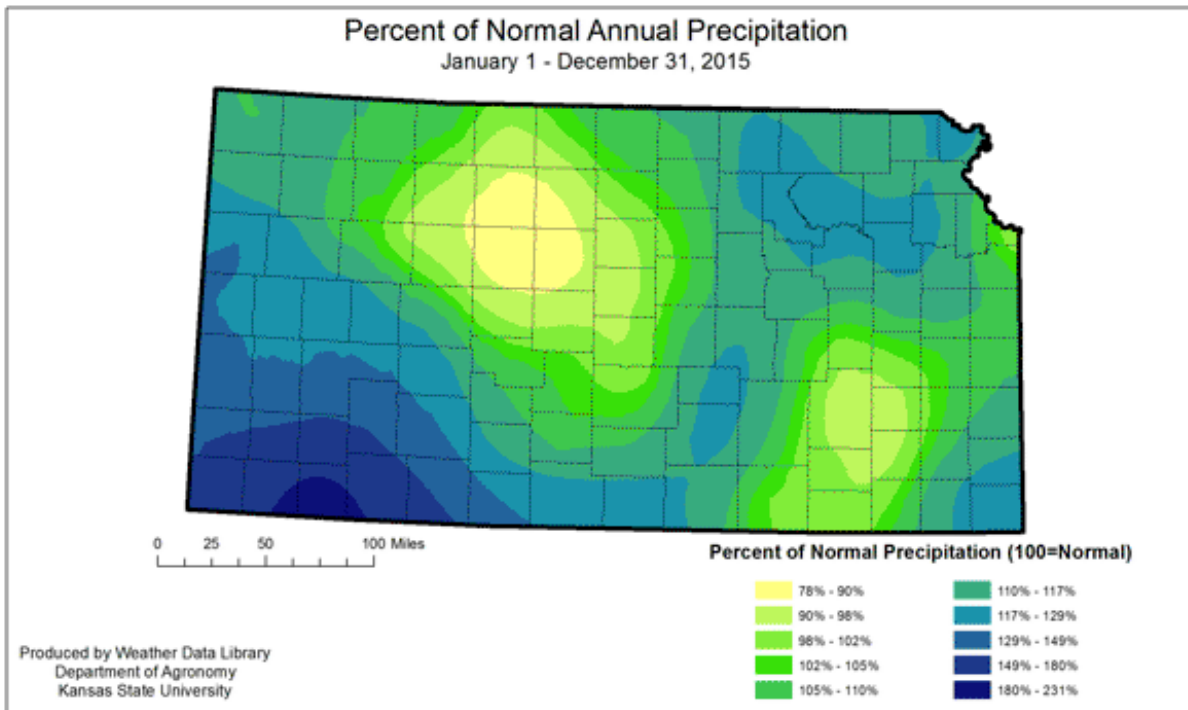
The statewide average was 7.57 inches, making it the third wettest May on record. A drier-than-average pattern in late summer (August-September) allowed for drought conditions to reappear and expand. However, the year ended on a wet note, with both November and December averaging above normal. December statewide average precipitation was 2.28 inches, more than double the normal December total. Only the Northwest Division had a drier-than-normal December, with an average of 0.50 inches, or 80 percent of normal. The greatest annual total for the year was recorded at Oswego, in Labette County, at 59.2 inches. The driest reporting station was 16.12 inches at Loretta, in Rush County, with just 16.12 inches. The greatest 24-hour precipitation total reported was 6.9 inches at Sun City in Barber County on July 30th.



Kansas State University Department of Agronomy

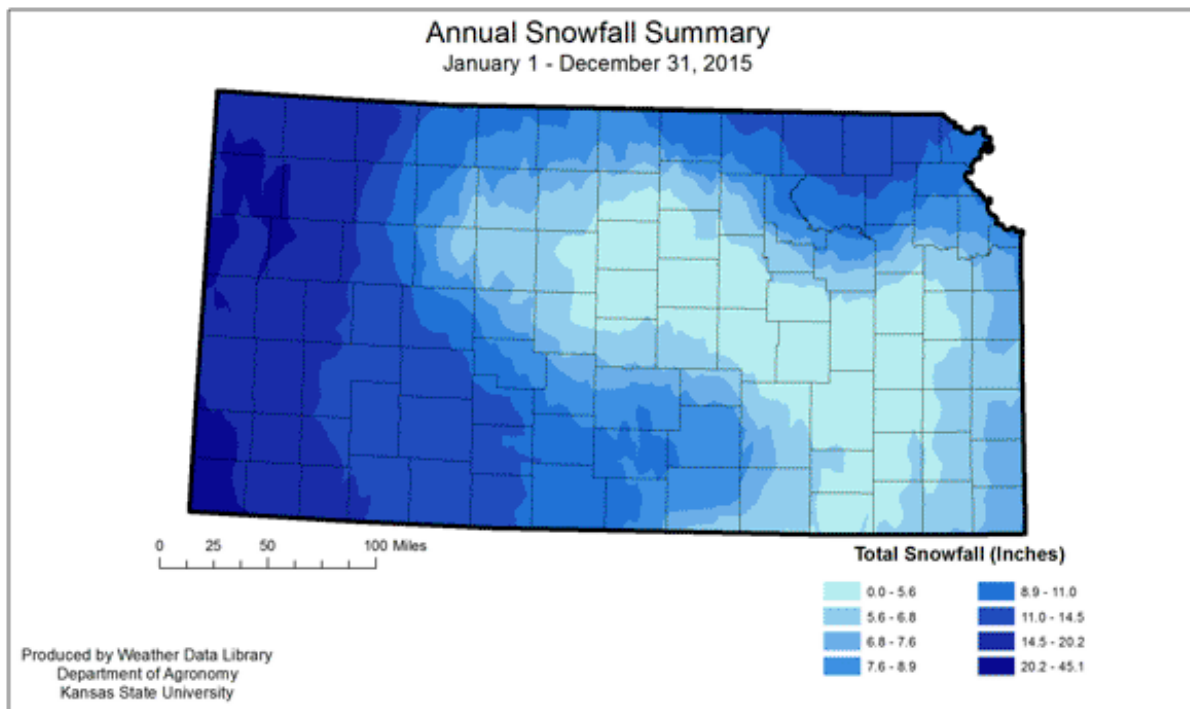
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Snow was not as much of a factor in 2015. The biggest impact came as an early November event, which signaled the onset of wetter conditions at the end of the year. The greatest total for the year was 34.1 inches at Atwood in Rawlins County. This location also reported the greatest 24-hour total with 22 inches on the 11th of November. The state average annual snowfall for 2015 was 8.6 inches, well below the 2014 average of more than 21 inches. The greatest snowfall totals were seen in the Northwest Division, while several stations reported no snow at all in 2015. In the southeast, much of

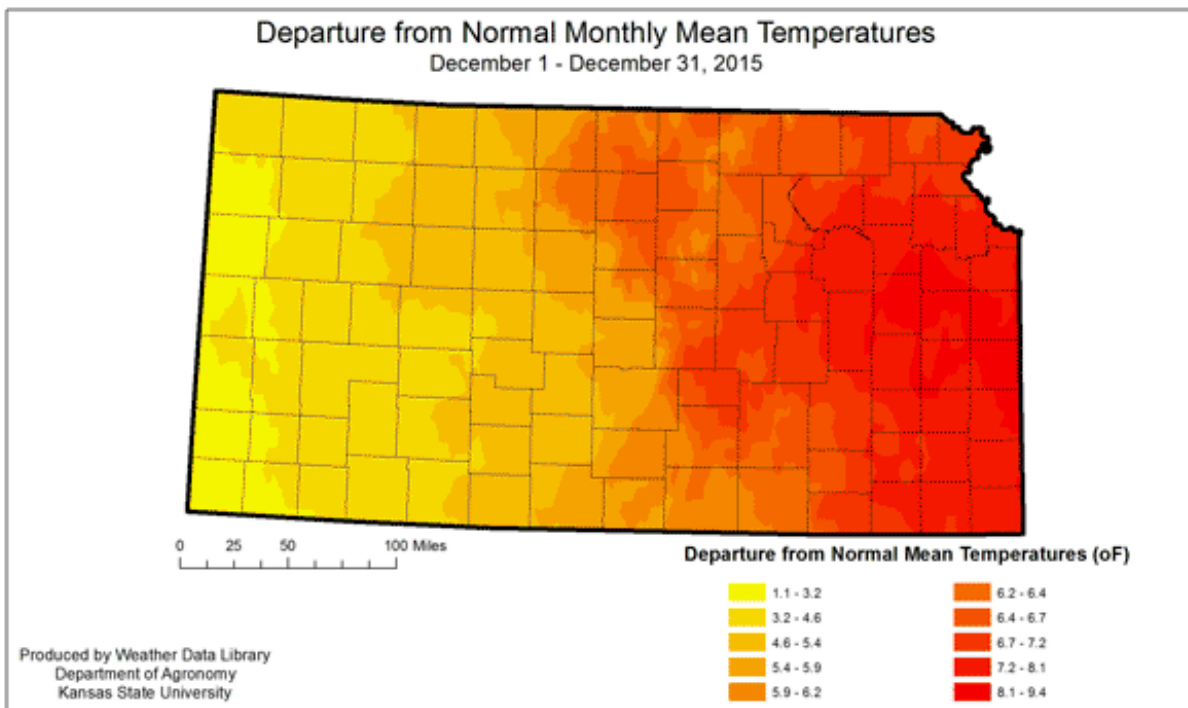
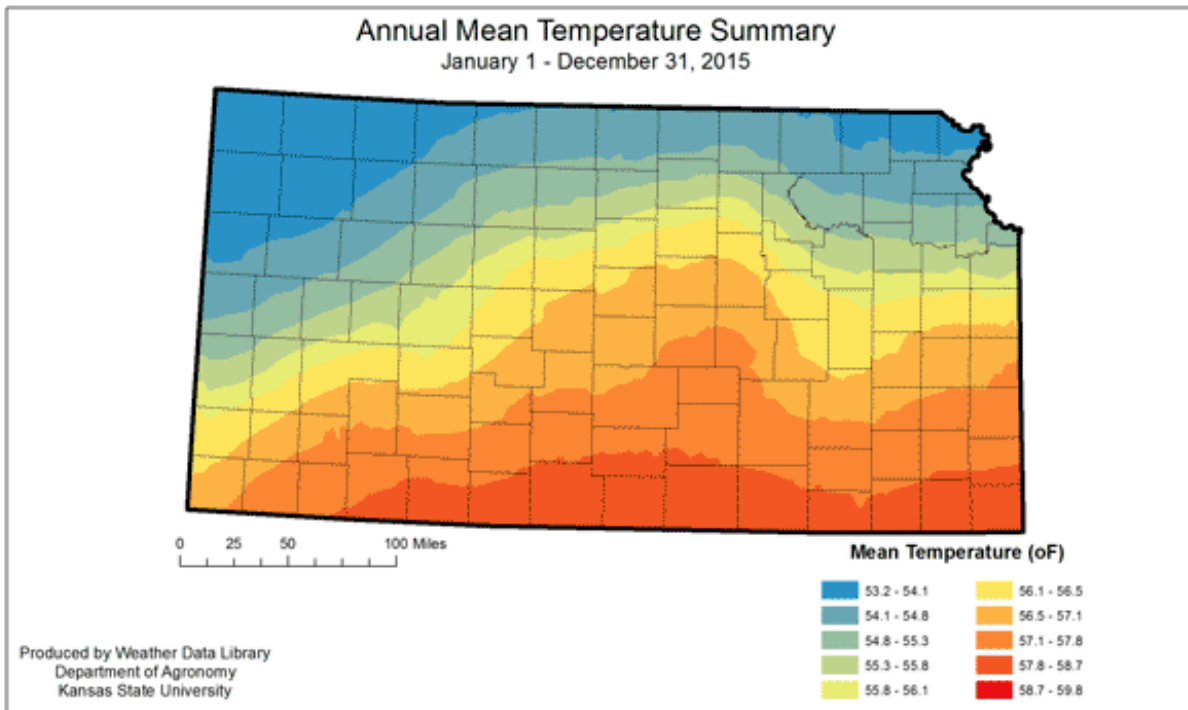
the moisture that ended the year came as rain, not snow.



Temperatures averaged above normal for the year. Statewide average temperature in 2015 was 56.1 degrees F, which places it as the 11th warmest on record. Only February, May, and October averaged below normal. September and December vied for the greatest departure from normal. September averaged 74.2 degrees F, or 5.9 degrees warmer than normal; December averaged 37.7 degrees F, or 5.8 degrees warmer than normal.

Temperatures fluctuated considerably during the year, ranging from 110 degrees F at Hudson (Stafford County) on July 14th to -16 degrees F at St. Francis (Cheyenne County) on January 1st. Despite being warmer than average, all divisions also had temperatures plunging below zero. Even the Southeast Division recorded sub-zero temperatures, the coldest of which was -3 degrees F at Cassoday on January 8th.

The average date for the last spring freeze was April 18th. The earliest start to the growing season was a last freeze on March 29th at various locations. Clay Center had the latest freezing temperature with 31 degrees F reported on May 22nd. There were widespread temperatures of 32 degrees F or lower in western Kansas on the 12th of May. The first fall freeze was also early in parts of the state. The average date was October 13th, but there were reports of freezing temperatures parts of the state on September 19th and 20th. The latest first frost was reported at Big Hill Lake on November 22nd when temperatures plunged to 24 oF. The average length of the growing season was 200 days. The shortest growing season was at Dresden in Decatur County with 147 days. The station with the longest growing season was Yates Center, Woodson County, with 230 days.

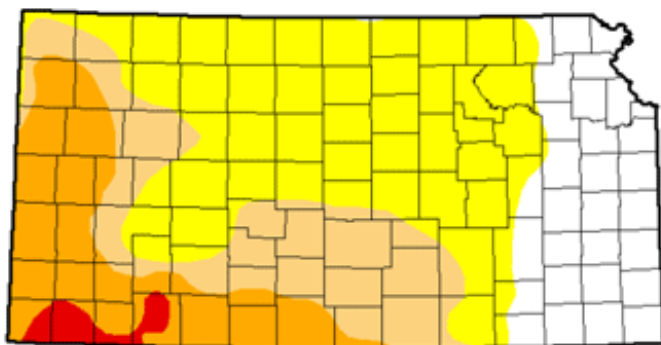


Drought conditions have shifted over the year, but end in a similar pattern to the start of the year. While none of the state was in exceptional drought, almost 6 percent of the state was in extreme drought conditions at the start of the year. By the end of the year, the portion of the state in extreme drought dropped to 2 percent. Wet conditions during the summer eased the impacts significantly. By the end of the summer, most of the eastern half of the state had moved into a drought-free status. Lack of moisture in the late fall resulted in deterioration. That meant abnormally dry conditions

returned to the east. However, the wet end to the year substantially reduced the drought coverage across the state. Little change is expected during the winter. Normal spring rains are critical for continued improvement in drought conditions. The El Niño/Southern Oscillation (ENSO) has enhanced moisture across the region, and is expected to continue into the spring. The uncertainty of the continued El Niño provides little guidance for the summer seasonal outlook.

U.S. Drought Monitor Kansas

January 6, 2015
(Released Thursday, Jan. 8, 2015)
Valid 7 a.m. EST



Author:
Brad Rippey
U.S. Department of Agriculture



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

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	19.49	43.02	18.91	16.71	1.88	0.00
Last Week 12/02/2014	19.49	43.02	19.18	16.05	2.25	0.00
3 Months Ago 10/02/2014	24.89	30.35	25.25	17.25	2.25	0.00
Start of Calendar Year 12/02/2014	19.49	43.02	19.18	16.05	2.25	0.00
Start of Water Year 09/02/2014	18.51	35.36	26.63	17.13	2.37	0.00
One Year Ago 01/02/2014	4.71	48.37	13.04	28.30	5.58	0.00

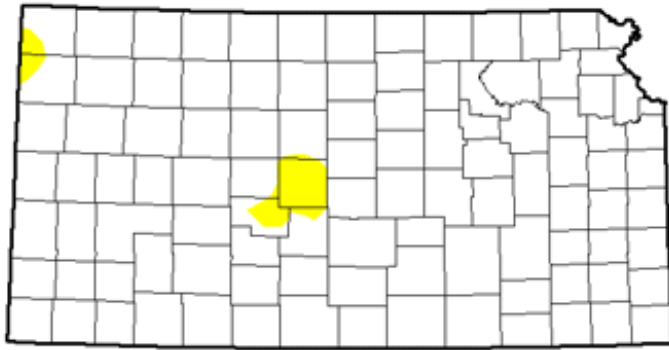
Intensity

- 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.

U.S. Drought Monitor Kansas

December 29, 2015
(Released Thursday, Dec. 31, 2015)
Valid 7 a.m. EST



Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	97.84	2.16	0.00	0.00	0.00	0.00
Last Week 12/22/2015	95.01	4.99	0.00	0.00	0.00	0.00
3 Months Ago 09/29/2015	80.79	14.72	4.48	0.00	0.00	0.00
Start of Calendar Year 12/01/2014	19.49	43.02	19.18	16.05	2.25	0.00
Start of Water Year 09/01/2015	80.79	14.72	4.48	0.00	0.00	0.00
One Year Ago 12/01/2014	19.49	43.02	19.18	16.05	2.25	0.00

Author:
Chris Fenimore
NOAA/NESDIS/NCEI



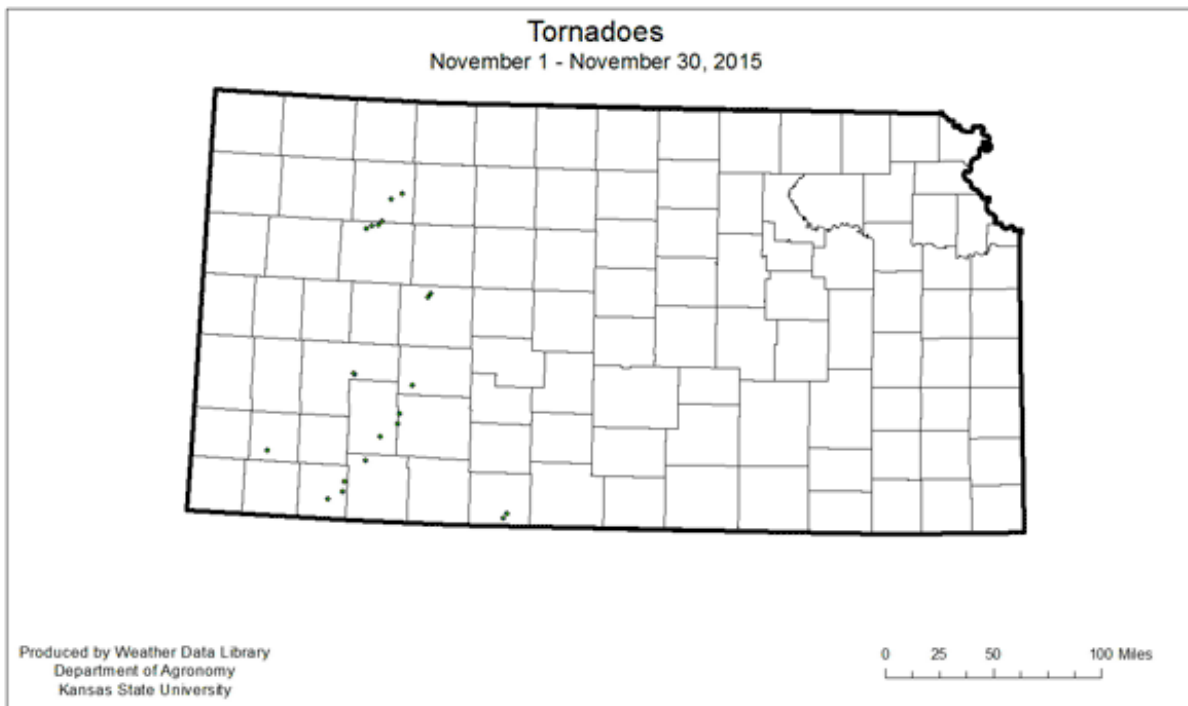
<http://droughtmonitor.unl.edu/>

Intensity

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
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The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

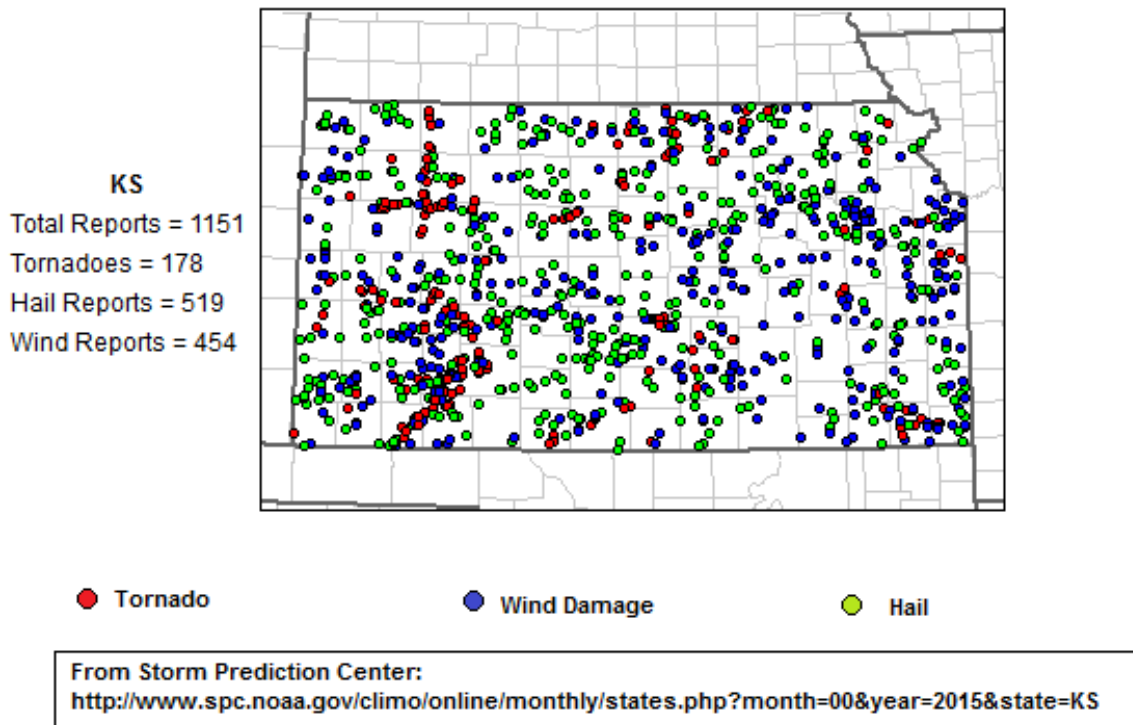
Severe weather was a factor in 2015, and the tornado season was more active than in previous years, particularly in November. Preliminary numbers from the Storm Prediction Center (SPC) show a total of 178 tornadoes in 2015. This compares to a five-year average (2008-2012) of 116 tornadoes.



There were 519 hail reports and 454 reports of damaging winds. According to the National Climatic Data Center (NCDC) storm database, there were 202 flood or flash flood events affecting over 75

counties through the end of September 2015. Preliminary reports of total damage to property and crops from the floods was more than 6.8 million dollars. Generally, these property and crop damage reports are underestimated. In many cases, crop damage isn't immediately available and fails to be included in the storm total. Likewise, property damage from uninsured losses often is also missing in the overall total.

Annual Severe Weather Report Summary - 2015



Annual Summary

Kansas Climate Division Summary

Precipitation (inches)

Temperature (°F)

Kansas State University Department of Agronomy

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Division	2015 Jan. through Dec.				Monthly Extremes		
	Total	Dep. ¹	% Normal	Ave	Dep. ¹	Max	Min
Northwest	20.84	-0.52	97	54.2	2.1	107	-17
West Central	21.67	0.90	103	55.1	1.7	106	-10
Southwest	28.23	8.33	141	57.4	2.3	108	-6
North Central	27.45	-0.56	96	55.4	2.0	108	-6
Central	28.57	-0.72	96	57.1	2.2	108	-6
South Central	34.90	3.58	111	57.7	1.3	110	-2
Northeast	39.55	4.55	112	54.8	1.4	102	-10
East Central	37.57	-0.35	97	56.5	1.5	103	-8
Southeast	41.69	0.20	99	57.9	1.1	104	-3
STATE	32.68	3.66	113	56.2	1.7	110	-17

1. Departure from 1981-2010 normal value

2. State Highest temperature: 110 oF at Hudson (Stafford County) on July 14th.

3. State Lowest temperature: -17 oF at St. Francis (Cheyenne County), January 1st

4. Greatest Annual rainfall: 59.2 inches at Oswego, Labette County (NWS); 64.05 at Topeka 4.6 ESE, Shawnee County (CoCoRaHS).

Source: KSU Weather Data Library

Mary Knapp, Weather Data Library
mknapp@ksu.edu