Issue 678

K·STATE
Research and Extension

Extension Agronomy

eUpdate

03/09/2018

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, 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 Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. First hollow stem update: March 6, 2018

Cattle should be removed from wheat pastures when the crop reaches first hollow stem (FHS).

Grazing past this stage can severely affect wheat yields (for a full explanation, please refer to eUpdate article "Optimal time to remove cattle from wheat pastures: First hollow stem" in the Feb. 23, 2018 issue).

First hollow stem update

In order to screen for FHS during this important time in the growing season, the K-State Extension Wheat and Forages crew measures FHS on a weekly basis in 28 different commonly grown wheat varieties in Kansas. The varieties are in a September-sown replicated trial at the South Central Experiment Field near Hutchinson.

Ten stems are split open per variety per replication (Figure 1), for a total of 40 stems monitored per variety. The average length of hollow stem is reported for each varieties in Table 1. As of March 6, none of the varieties had yet reached FHS but all varieties had started to elongate the stem.

Figure 1. Ten main wheat stems were split open per replication per variety to estimate first hollow stem for this report, for a total of 40 stems split per variety. Photo by Romulo Lollato, K-State Research and Extension.

Table 1. Length of hollow stem measured Feb. 21, Feb. 28, and Mar. 6, 2018, from 28 wheat

varieties sown mid-September 2017 at the South Central Experiment Field near Hutchinson. The critical FHS length is 1.5 cm (about a half-inch or the diameter of a dime).

Variety	2/21/2018	2/28/2018	3/6/2018
AM Eastwood	0.19	0.28	0.30
NE10478-1	0.15	0.25	0.24
LCH13-22	0.16	0.21	0.24
LCH14-55*	0.17	0.19	0.25
LCH14-89	0.15	0.22	0.24
LCS Chrome	0.16	0.20	0.25
LCS Pistol	0.17	0.22	0.27
Bentley	0.12	0.22	0.23
Doublestop CL Plus	0.15	0.21	0.26
Gallagher	0.18	0.26	0.30
Iba	0.16	0.20	0.26
Lonerider	0.15	0.21	0.26
OK12716	0.15	0.21	0.28
Ruby Lee	0.13	0.19	0.25
Smith's Gold	0.18	0.27	0.24
Spirit Rider	0.19	0.24	0.31
Stardust	0.18	0.23	0.25
Paradise	0.19	0.23	0.32
Bob Dole	0.19	0.25	0.28
SY Achieve CL2	0.18	0.26	0.25
SY Benefit	0.18	0.26	0.30
SY Rugged	0.13	0.23	0.23
1863	0.21	0.24	0.30
Joe	0.16	0.21	0.27
Larry	0.15	0.22	0.25
Oakley CL	0.14	0.21	0.28
Tatanka	0.12	0.22	0.24
Zenda	0.19	0.23	0.28
Differences among varieties	No	Yes	No
LSD	-	0.04	-

None of the varieties had yet reached FHS as of March 6, and interestingly, there has not been much development since the last measurement taken on February 28. While FHS is usually achieved within a few days from when the stem starts to elongate, the below-average temperatures and extremely dry topsoil conditions experienced during the period between both measurements have slowed down crop development. Nonetheless, we advise producers to closely monitor their wheat pastures at this time.

The intention of this report is to provide producers an update on the progress of FHS development in different wheat varieties. Producers should use this information as a guide, but it is extremely important to monitor FHS from an ungrazed portion of each individual wheat pasture to make the decision of removing cattle from wheat pastures.

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2. Pay attention to growth stage for spring herbicide decisions on wheat

Many areas of Kansas had good rains early last fall, but limited precipitation the rest of the fall and winter. Most early-planted wheat fields have good stands and advanced stages of growth, but later planted fields may have variable stands and limited tillering coming into spring. Producers should pay close attention to the growth stage of their wheat before making their herbicide applications.

Dicamba can be applied to wheat between the 2-leaf and jointing stages of wheat. Application of dicamba after wheat reaches the jointing stage of growth causes severe prostrate growth of wheat and significant risk of yield loss. Dicamba is effective for control of kochia, Russian thistle, and wild buckwheat, but is not good for control of mustard species. Kochia, Russian thistle, and wild buckwheat are summer annual weeds that may emerge before or after wheat starts to joint, so timing of dicamba for control of these weeds can sometimes be difficult. Fortunately, dicamba provides some residual control of these weeds following application.

Other herbicides that must be applied prior to jointing include Agility SG, Olympus, Orion, PowerFlex HL, Pulsar, and Rave. Beyond should be applied to 1 gene Clearfield wheats after tiller initiation and prior to jointing, but can be applied to 2-gene Clearfield wheats until the second node is detected at the soil surface.

MCPA and 2,4-D have different application guidelines. In general, MCPA is safer on wheat than 2,4-D, especially when applied prior to tillering. We recommend that 2,4-D not be applied to wheat until it is well-tillered in the spring. Application of 2,4-D prior to tillering hinders the tillering process, causes general stunting and can result in significant yield loss.

Figure 1. Stunting from an application of 2,4-D to wheat prior to tillering. Photo by Dallas Peterson, K-State Research and Extension.

2,4-D is labeled for application to wheat from the full-tiller stage until prior to the boot stage of growth, but is probably safest between full-tiller and jointing stages of growth. Wheat will sometimes exhibit prostrate growth from 2,4-D applications applied in the jointing stage of growth, but yields generally are not significantly affected if applied before the boot stage of growth.

MCPA is relatively safe on young wheat and can be applied after the wheat is in the three-leaf stage (may vary by product label) until it reaches the boot stage of growth. Consequently, MCPA would be preferred over 2,4-D if spraying before wheat is well-tillered. Neither herbicide should be applied once the wheat is near or reaches the boot stage of growth, as application at that time can result in malformed heads, sterility, and significant yield loss (Figure 2).

Figure 2. Malformed heads from an application of 2,4-D at boot stage. Photo by Dallas Peterson, K-State Research and Extension.

Both 2,4-D and MCPA are available in ester or amine formulations. Ester formulations generally provide a little better weed control than amine formulations at the same application rates, but also are more susceptible to vapor drift. However, the potential for vapor drift damage in early spring is minimal. Ester formulations generally are compatible for use with fertilizer carriers, while amine formulations often have physical compatibility problems when mixed with liquid fertilizer.

Other herbicides used in the spring on wheat can be applied up to the time the flag leaf is visible, or later. Affinity BroadSpec, Affinity TankMix, Ally Extra SG, Express, Harmony + 2,4-D or MCPA, Harmony Extra, Huskie, Quelex, and Supremacy must be applied before the flag leaf is visible. Huskie, Weld, and WideMatch can be applied through the flag leaf stage. Herbicides that can be applied later in the spring – prior to the boot stage -- include Ally + 2,4-D, Amber, Finesse, Starane Ultra, and Starane Plus Salvo. Starane is a better choice than dicamba products for control of kochia after wheat moves into the jointing stage of growth. Remember that weeds are most susceptible at early growth stages and coverage becomes difficult as the wheat canopy develops, so the earliest practical and labelled applications generally result in the best weed control.

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3. Recommendations for topdressing wheat with sulfur

Traditionally, sulfur (S) deficiency was most common on high-yielding crops grown on irrigated sandy soils that are low in organic matter and subject to leaching. However, due to reduced S additions from the atmosphere (there is less S in the air now) and continued crop removal, an increasing number of finer-textured soils have shown S deficiency.

In recent years, sulfur deficiency in wheat has become common in many areas of Kansas, particularly in no-till wheat where cooler soil temperatures can slow S mineralization in the soil. Classic S deficiency symptoms, confirmed by soil and plant analysis, have been observed in many no-till wheat fields during periods of rapid growth in the spring. These observed deficiencies generally occur during periods of rapid growth prior to jointing or during stem elongation.

The photos below are a good representation of the problem. Generally the S-deficient wheat is yellow and stunted (Figure 1-top photo), and the problem is found in patches in the field (Figure 1-bottom photo), especially in areas where there has been previous soil erosion or soil movement. Sulfur deficiency in growing crops is often mistaken for nitrogen (N) deficiency. However, unlike N deficiency where the older leaves show firing and yellowing, with S deficiency, the pale yellow symptoms of S deficiency often appear first on the younger or uppermost leaves. Wheat plants with S deficiency often eventually become uniformly chlorotic. The patchy S-deficient areas of the field are often found on hilltops or sideslopes where erosion has occurred and soil organic matter is reduced, or where leaching is more pronounced. In terraced or leveled fields, wheat in areas where topsoil was removed or significant cuts were made, also commonly shows symptoms.

Figure 1. Sulfur deficiency in wheat. Photos by Dorivar Ruiz Diaz, K-State Research and Extension.

The majority of S in soil is present in organic forms (requires mineralization to become plant available) in surface soils and as sulfate (SO_4^{2-}), an inorganic form and plant available. Sulfate is relatively soluble, so it tends to leach down from the surface soil into the subsoil. In many of our Kansas soils it will accumulate in the B horizon (subsoil) in two forms:

- Some sulfate will be sorbed to clay surfaces and coatings similar to the processes whereby phosphates are sorbed, though sulfate will not be sorbed as strongly.

- Sulfate will also be present in the subsoil of many Kansas soils as gypsum.

A soil test for available sulfate in the soil profile is available. For proper interpretation of this test, soil organic matter, soil texture, the crop to be grown, and the expected yield level all need to be considered. Since sulfate is mobile, sampling to a 24-inch depth is important. Accurate estimates of S needs cannot be made from a surface sample alone. However, due to the relatively high demand for S during the rapid vegetative growth phase of wheat and relatively shallow rooting by the wheat crop at this time, the S measured in the deeper subsoil by the test may not be available to wheat in the early spring, especially where soils are still cold.

Sulfur deficiency in wheat has been showing up early in the spring, shortly after green-up, before organic S is mineralized from soil organic matter, and before wheat roots can grow into the subsoil to utilize sulfate accumulated there. Deficiencies of S are often difficult to identify because the paling in crop color is not always obvious. Wheat plants lacking S also may be stunted, thin-stemmed, and spindly. In the case of wheat and other cereal grains, maturity is delayed. Due to the slower growth and lack of good tillering, winter annual weed competition is also enhanced.

Many fields in north central and northeast Kansas now have an established history of S deficiency for wheat. In this situation, rather than waiting for symptoms to appear in the spring, farmers may want to consider a winter topdress application of S as a preventive measure.

There are many S-containing fertilizer materials. Several dry materials are available that can be blended with dry phosphorus or nitrogen fertilizers for winter/spring topdressing. Some of these products are best used in preplant applications, however.

- **Elemental S** (typically 90-95 percent S) is a dry material marketed by several manufacturers. Before it becomes available for plant uptake, elemental S must first be oxidized by soil microorganisms to sulfate-S and this can be a slow process when surface-applied. As a result, this material is well suited for preplant applications only. Elemental S is not suited for corrective applications to S-deficient wheat in the spring.

- **Ammonium sulfate**, (21-0-0-24S) is a dry material that is a good source of both N and available S. It has high acid-forming potential, however, and soil pH should be monitored. Ammonium sulfate is a good source to consider for both preplant and topdressing to correct existing sulfur deficiencies.

- **Gypsum** (analysis varies) is calcium sulfate, and is commonly available in a hydrated form containing 18.6 percent S. This material is commonly available in a granulated form that can be blended with other materials. Since it is a sulfate source, it would be immediately available, and is another good source for spring topdressing.

- **New N-P-S products,** such as Microessentials, 40-Rock, and others, are ammonium phosphate materials formulated with sulfur, and in some cases micronutrients such as zinc. In most of these products the sulfur is present as a combination of elemental-S and sulfate-S.

There are also liquid sources of sulfur fertilizers available.

- **Ammonium thiosulfate**, (12-0-0-26S) is the most popular S-containing product used in the fluid fertilizer industry, as it is compatible with N solutions and other complete liquid products.
- **Potassium thiosulfate**, (0-0-25-17S) is a clear liquid product that can be mixed with other liquid fertilizers.

Liquid and dry fertilizer sources can be applied in combination with N at topdressing this spring. However, is important to consider the potential plant availability of each S fertilizer source for this wheat growing season.

For more information please see KSRE publication MF 2264 "*Sulfur in Kansas"* at http://www.ksre.ksu.edu/bookstore/pubs/MF2264.pdf

Estimations of required application rates of S can be found in the KSRE publication MF-2586 "*Soil Test Interpretation and Fertilizer Recommendations*" at
http://www.ksre.ksu.edu/bookstore/pubs/mf2586.pdf

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4. Stripe rust outlook for 2018

The days are getting longer and temperatures are giving us all hope for spring. This is also the time of year that producers start asking about the outlook for wheat diseases in Kansas.

Recent research suggests that regional weather conditions early in the growing season influence the risk of problems with stripe rust. This research identified that regional soil moisture conditions in February are strongly associated with outbreaks of stripe rust. Weather conditions in Texas appear to play a critical role in the development of regional outbreaks of stripe rust. Keep in mind that the wheat in Texas is actively growing this time of year and often approaching the jointing stages of growth by the end February. Outbreaks of stripe rust in Texas during February often set the stage for the disease to move north into Kansas and the Central Plains. The research noted that wet conditions in key wheat-producing regions of central Texas often increase the risk of regional outbreaks of stripe rust. Dry conditions in this region often suppress the risk of outbreaks. Maps of soil moisture conditions in February help illustrate this pattern (Figure 1). In these maps, dry conditions are shown as red or orange colors, wet conditions are green, and white is "mid-range" (neither unusually dry nor wet). Notice that in the low disease years, dry conditions dominate in central and south central Texas. In years with severe disease, mid-range soil conditions are prevalent in these same regions of the country. The map for this year indicates the risk of severe stripe rust is low-to-moderate at the current time. Let's keep an eye on the disease situation and see what develops this year.

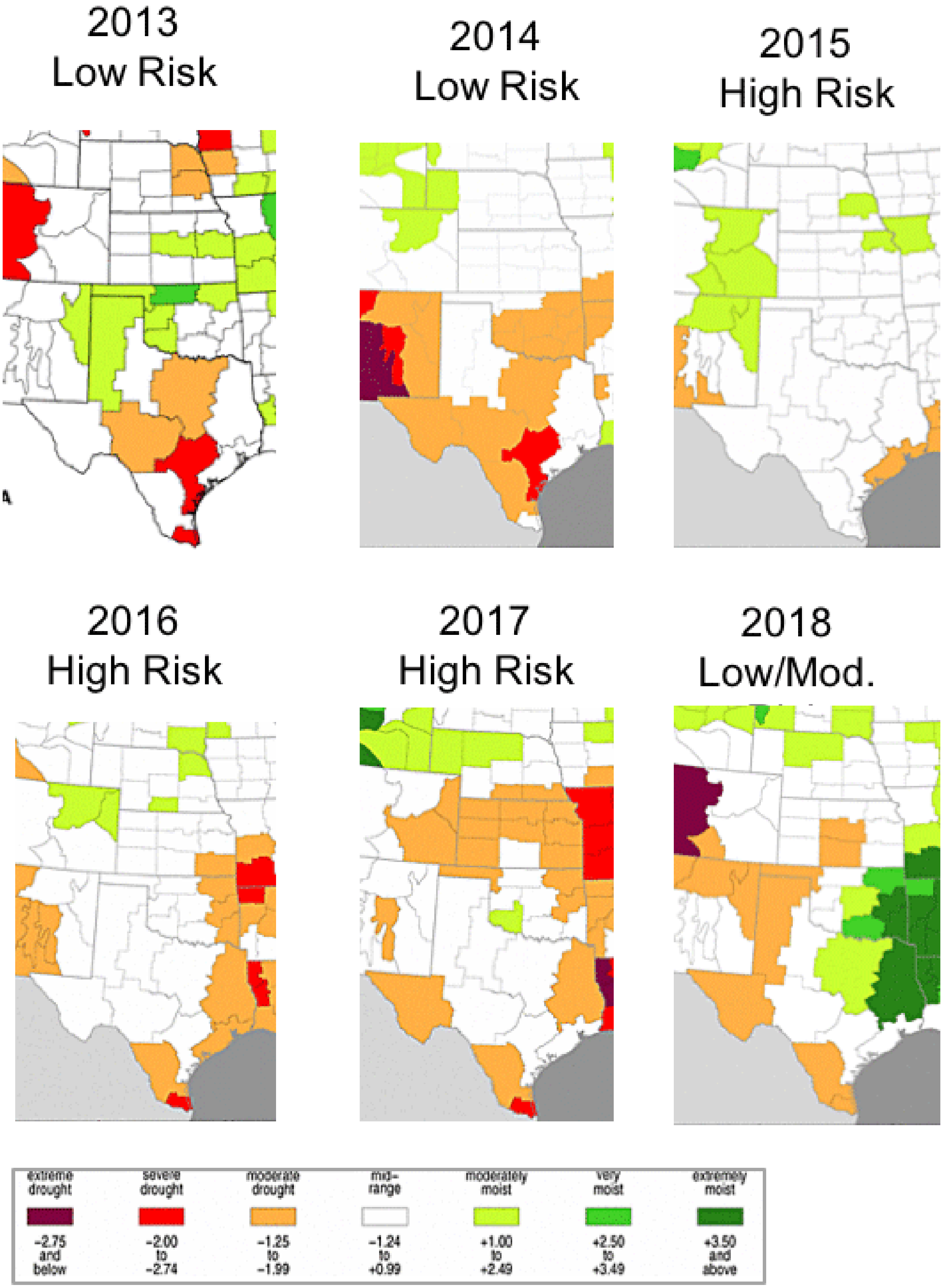

Figure 1. Maps of soil moisture levels in the central and southern Great Plains region from

2013-2018. Research indicates that soil moisture conditions in central Texas are often associated with regional outbreaks of stripe rust. Dry conditions in these regions often decrease the risk of severe disease. Mid-range or wet conditions favor disease development and regional outbreaks of disease. Soil moisture maps are based on NOAA "Palmer Z-Index".

Observations of Disease

Scouting reports from Texas and Oklahoma are also useful sources of information. Remember, reports of problems with rust to our south this time of year often indicates that we are heading for trouble here in Kansas. So far, reports from Texas indicate that rust was not an issue at most locations. However, stripe rust was reported at one research location west of San Antonio suggesting at least some risk for problems with stripe rust this year. To date, there have been no reports of stripe rust from Oklahoma in 2018. Trace levels of leaf rust were detected near Stillwater by Bob Hunger, OSU Plant Pathologist. Reports of leaf rust are not unusual for this time of year and are not cause for major concern. We should monitor the disease situation in Texas and Oklahoma carefully over the next month. At the moment, it appears dry conditions are holding the diseases in check and the risk of severe problems with stripe rust and leaf rust is moderate to low.

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5. Dust in the wind: Blowing soil and strong winds in Kansas

A large and dry storm system stalled over the central United States early this week. As a result, very strong winds overspread much of Nebraska, Kansas, Oklahoma, and Colorado during this period. Wind speed was impressive with the strongest gusts measured on Tuesday, March 6, across western and central Kansas, and especially the northwest. The Kansas Mesonet (mesonet.ksu.edu) was able to measure these winds and the top wind speeds observed at the low (6.5 feet) and high (30 feet) sensors are listed in Tables 1 and 2:

Table 1. Maximum wind speeds (mph) measured at the low (6.5 feet) sensors. Data collected by Kansas Mesonet.

Mesonet Station Name	Maximum 6.5 Feet Wind (mph)
Cheyenne	52
Sherman	51
Hill City, Wallace, La Crosse, Hays, Leoti	49

Table 2. Maximum wind speeds (mph) measured at the high (30 feet) sensors. Data collected by Kansas Mesonet.

Mesonet Station Name	Maximum 30 Feet Wind (mph)
Garden City	61
Hodgeman	59
Hays	58
Colby	57
Lane, McPherson 1S	56
Lorraine, Jewell, Harper	55
Lakin, Manhattan	53

Unfortunately, a side effect of these winds consisted of substantial fire weather and blowing dust issues across the region. Fires were reported across the entire state, some of which were several thousand acres in size including ones in Clark, Ellis, Harper, Kingman, and Greenwood counties. The dust however, was limited to just western Kansas. A corridor of dust went from northwest Kansas, south/southeastward into central Oklahoma, being wrapped around the stalled upper-level low pressure over Iowa (Figure 1).

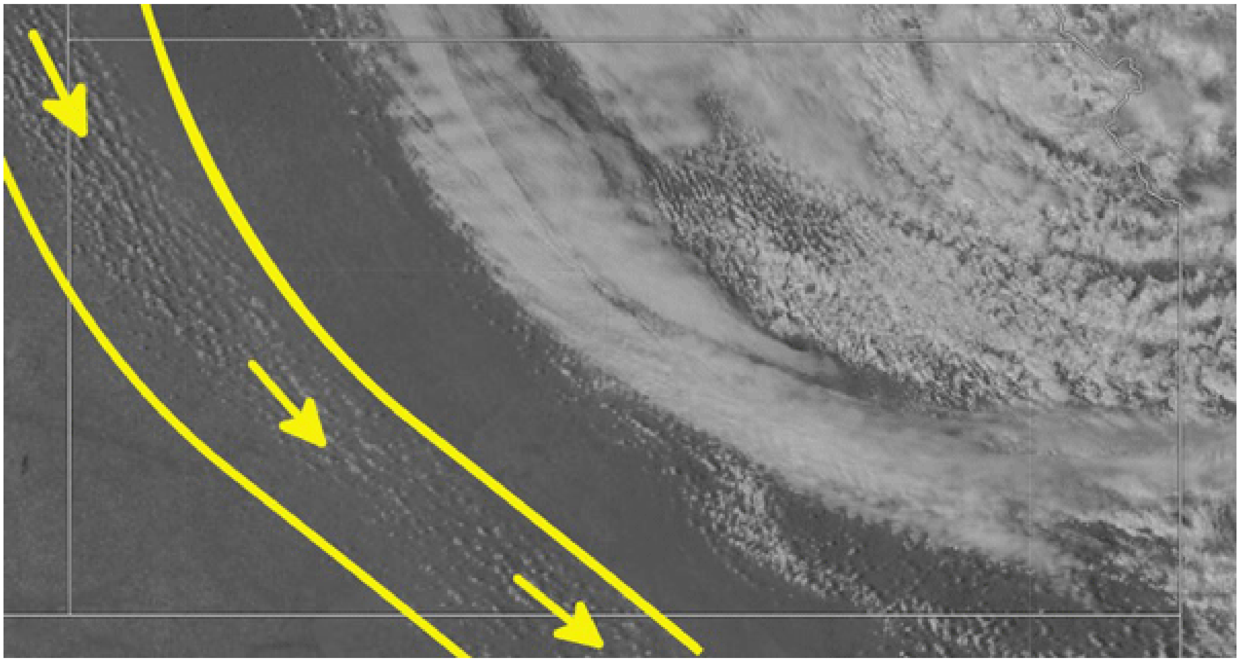

Figure 1. Blowing dust is highlighted between the yellow lines, as seen by GOES EAST satellite (via University of Wisconsin). Cumulus clouds reside atop of the dust as it moves south/southeast into Oklahoma. Widespread cloud cover is seen across east and north-central Kansas.

Dust on visible satellite is fairly subtle, but it had substantial impacts on ground conditions across the region. Reduced visibility is the biggest impact, with widespread reports in northwest Kansas of impaired driving conditions. Portions of I-70 and several US/KS routes were closed because it was unsafe. Even visibility in the towns became difficult (Figure 2). Current ongoing dry conditions and recent above-normal temperatures contributed to the amount of dust able to be lifted by the winds. Also, in general, the soils in the High Plains are sandier and sometimes left exposed due to agriculture. These scenarios mean soils are much more vulnerable to easy relocation and lofting by strong winds. Dust also has a different specific heat capacity than air -- meaning it warms faster than the air and absorbs solar radiation more effectively. Therefore, it modifies the air around it once lifted and continues to warm with incoming solar radiation. This increased heat was able increase lift (this process is described in more detail below) and develop small cumulus clouds which are seen in Figure 1 overtop the blowing dust.

Figure 2. Blowing dust in Norton, KS as seen by Caleb Wilson on Twitter (@wilscale).

Meteorology behind the strongest winds

While gusty winds were observed across the entire state, the blowing dust was concentrated where winds were strongest. These winds were oriented parallel and to the west of an upper-level low pressure center stalled over Iowa - very slowly spreading to the southeast (Figure 3). Very dry conditions were present due to a dry air mass that was in place. With strong solar insolation, the sun was able to warm the surface efficiently without any cloud obstruction. Therefore, the warm air was able to rise high into the lower atmosphere. This air displaces air above it at these higher altitudes forcing vertical mixing. When displaced, this upper air is mixed downward, bringing the momentum of winds aloft down with it. Winds above the surface on these days were moving very, very fast (up to 70 mph at ~14,000 feet), the height which surface air parcels were able to reach on this day. Therefore, winds up to 60 mph were achieved at the surface via this mixing of the warm surface air.

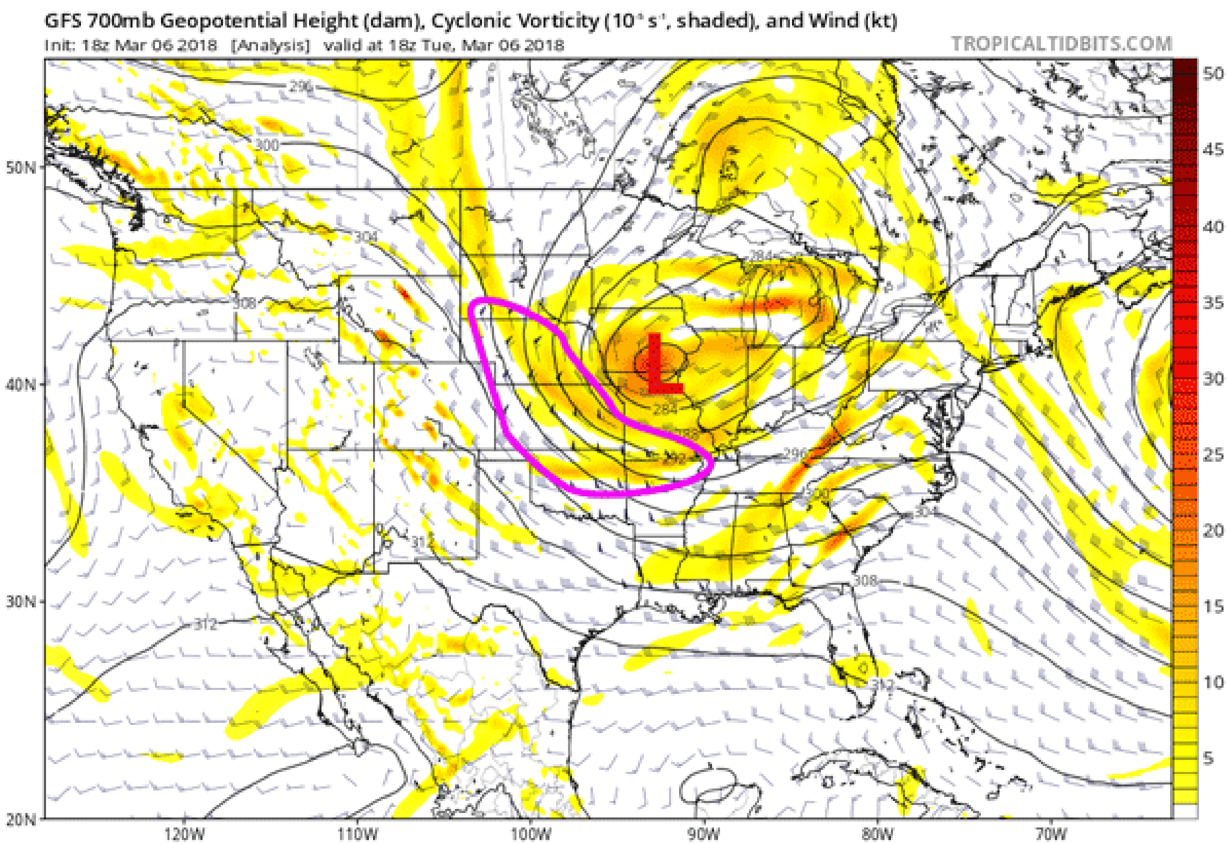

Figure 3. Winds at 700mb (roughly 14,000 feet above ground level) highlighted in pink where they exceed 50kts (60mph). The red "L" represents the center of the upper level low pressure system (analysis via TropicalTidbits.com)

Figure 3 shows a fairly widespread area of 60 to 70 mph winds at approximately 14,000 feet above the surface in the Central Plains. Thankfully, this large area didn't optimize all the strong winds to the surface. From the satellite image (Figure 1), note the cloud cover across much of Nebraska and eastern half of Kansas. This cloud cover shaded the earth's surface in eastern Kansas and prevented it from warming to the values further west, as seen on the Mesonet in Figure 4. Therefore, it prevented the strongest winds above the surface from mixing down, which is why none of the strongest wind gusts were observed in eastern Kansas.

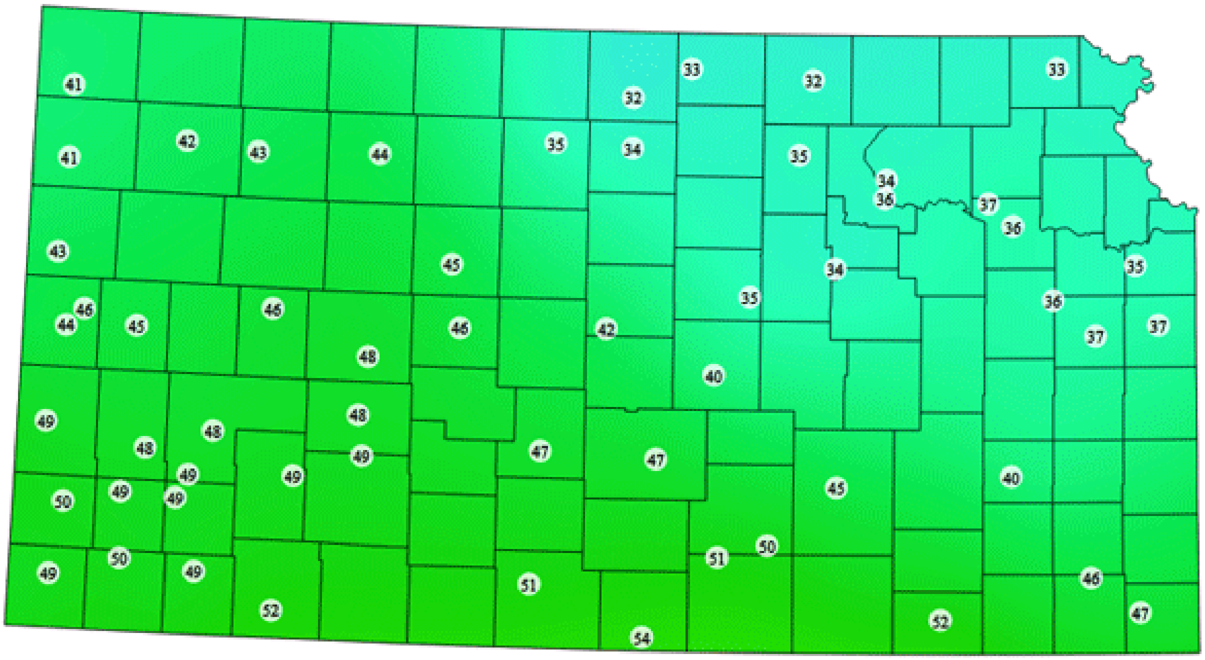

Figure 4. March 6th, 2:00 pm temperatures on the Kansas Mesonet (mesonet.ksu.edu). Note the warmer temperatures in western Kansas where there was no cloud cover.

Another factor to consider is the terrain. Western Kansas is obviously much flatter than eastern Kansas. Therefore, winds are less obstructed by topography and can reach greater speeds more easily than those over the Flint Hills, Ozarks, and Missouri River Valley.

Hopefully, future storm systems in the Great Plains aren't quite as dry (or windy). The current outlook isn't promising with continued warmer-than-normal temperatures for most of the state and dry conditions persisting for the next 1-2 weeks. Only isolated moisture is anticipated and will be most likely in eastern Kansas.

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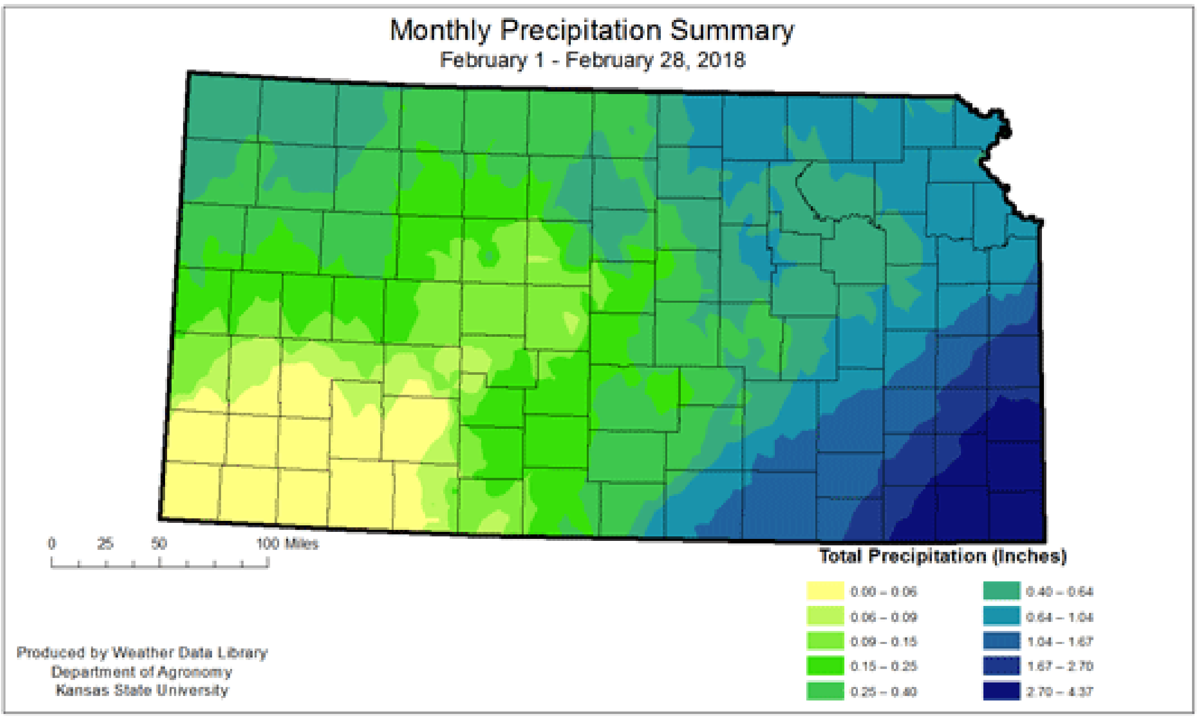
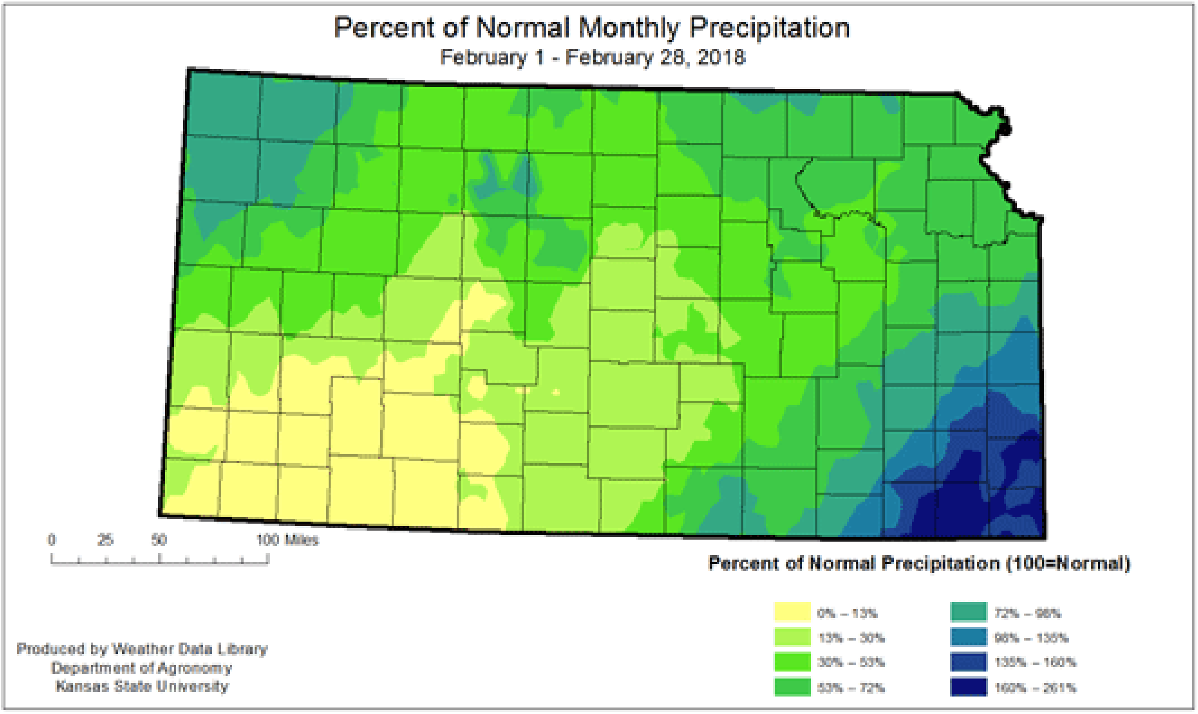
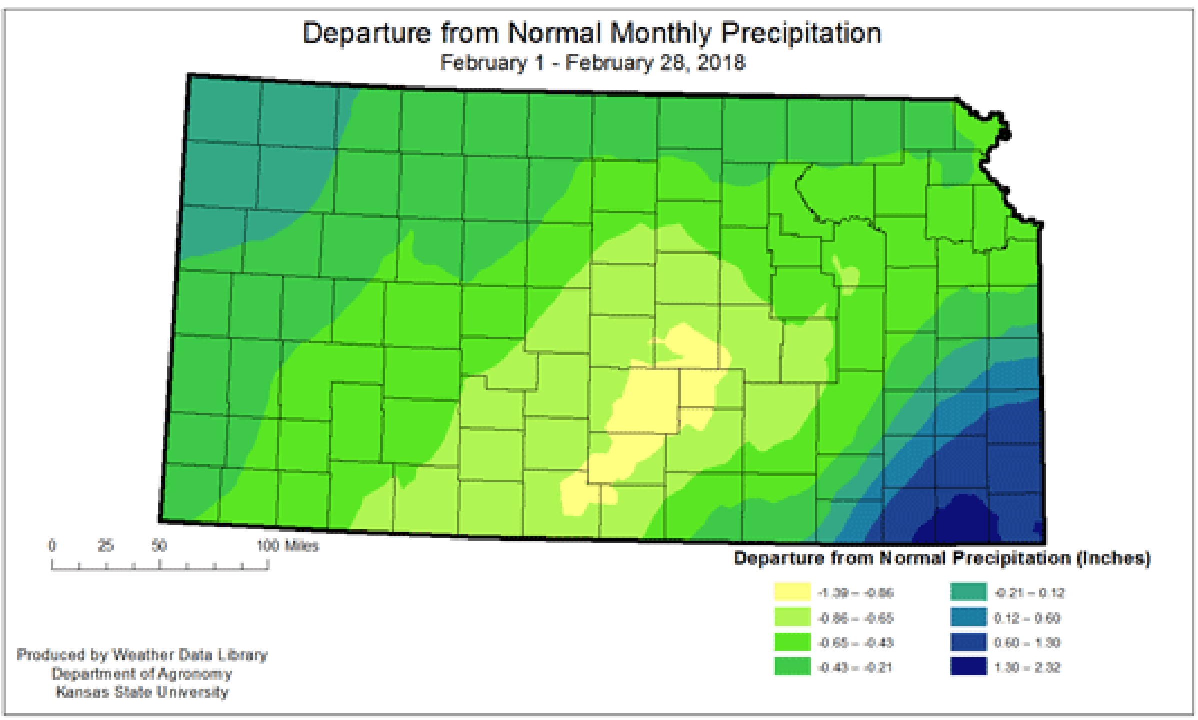
6. Kansas Weather Summary for February - Cool and dry

February moisture

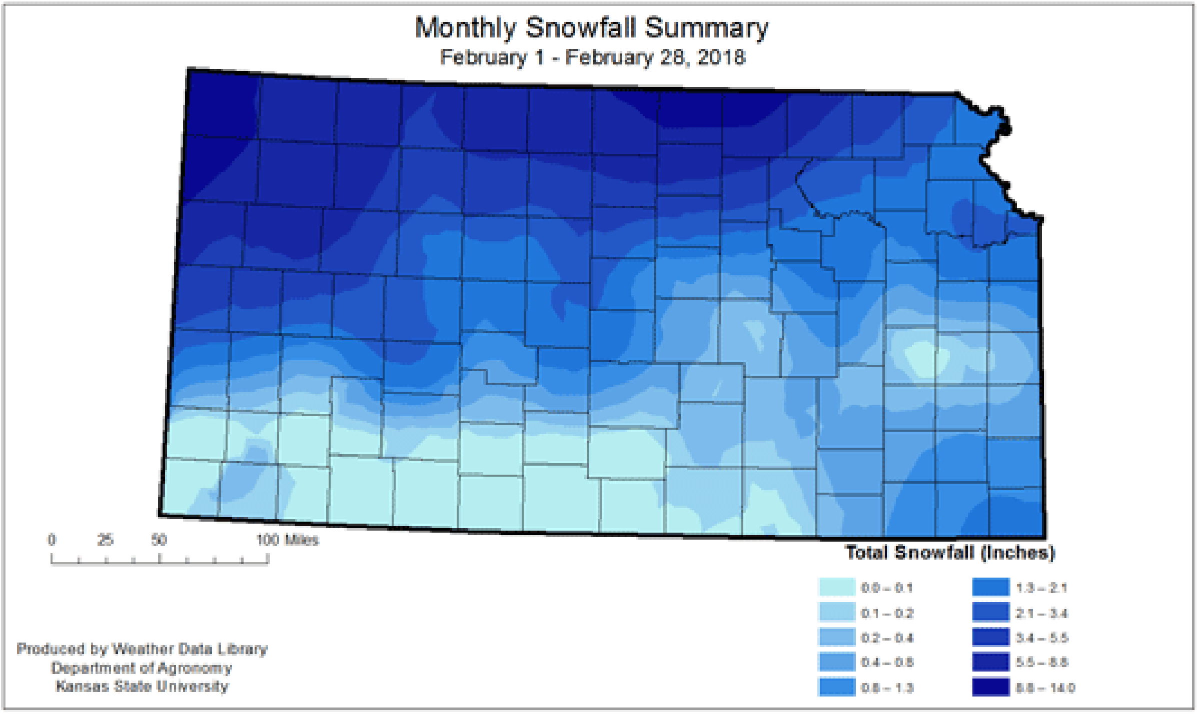
While most locations saw at least some moisture in February, overall the precipitation was below-normal for the month. Eight locations, mainly is the Southwest Division, saw just a trace of precipitation during February. State-wide, the average precipitation was 0.53 inches or 41 percent of normal. The Southeast Division was the only area that was above-normal for the month, with an average of 1.99 inches or 109 percent of normal. The Southwest Division, with an average of just 0.02 inches, had the lowest percent of normal with only 2 percent. The greatest monthly precipitation totals were 4.37 inches at Coffey Waterworks, Montgomery County (NWS) and 4.05 inches at McCune 1.6 NW, Crawford County (CoCoRaHS). Most of the precipitation came in the last week of February.





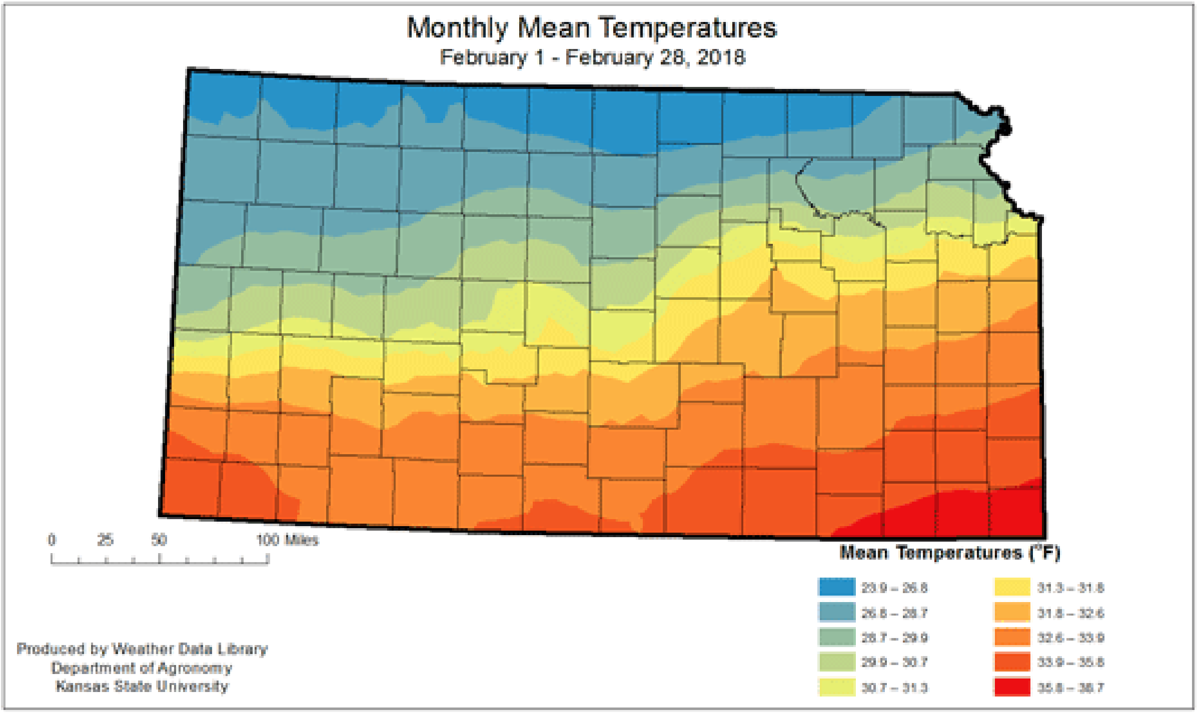


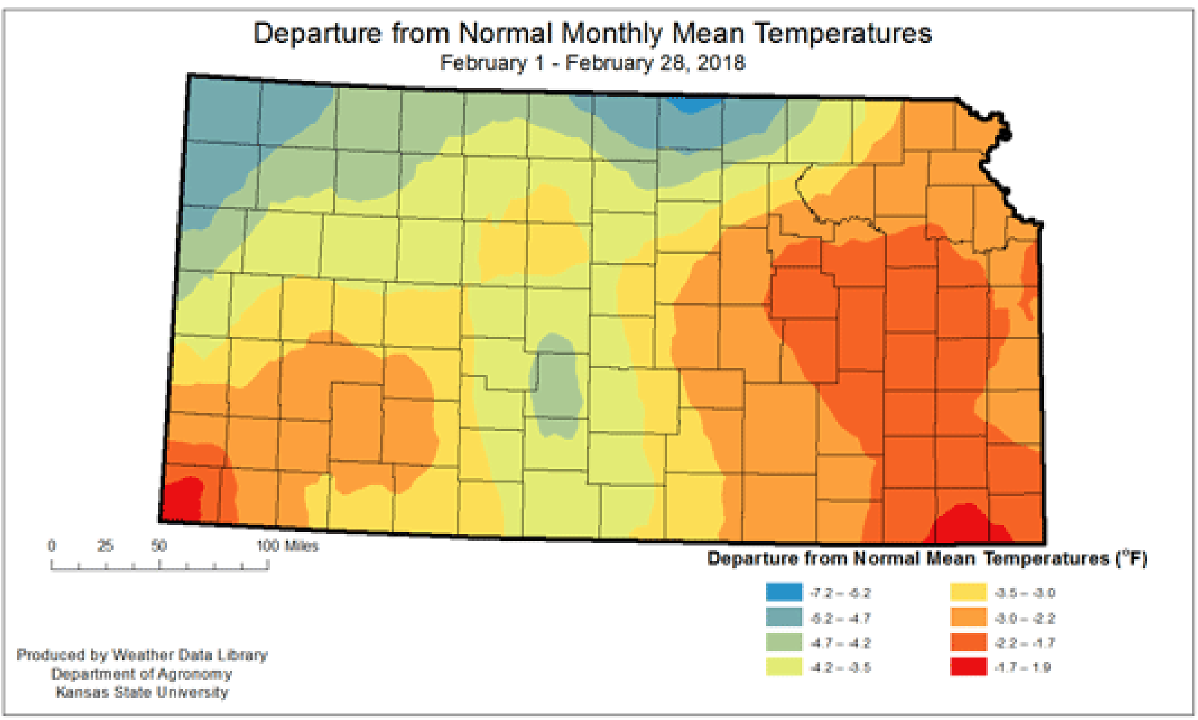
There was some February snow with twelve locations setting daily records for snowfall. The greatest daily snowfall report was 4.5 inches at Tribune 1W, Greeley County, on the 6th. The greatest snowfall totals for the month were 9.6 inches at Goodland, Sherman County (NWS) and 16.0 inches at St. Francis 12.1 NW, Cheyenne County (CoCoRaHS).



February temperatures

February continued the pattern of wide temperatures swings as might be expected with the dry air in place. The statewide average temperature was 30.7 degree F, or 3.3 degrees cooler-than-normal. The warm days weren't persistent enough to outweigh the very cold start to the month. All divisions averaged below-normal for February. The Northwest Division had the greatest departure from normal, with an average of 26.7 degrees F or 5.0 degrees cooler-than-normal. The Southeast Division came closest to normal with an average temperature of 34.6 degree F and a departure of -1.9 degrees. The warmest temperature reported for the month was 80 degrees F at Ashland, Clark County, on the 15th and Tallgrass Prairie Park, Chase County, on the 19th. The coldest reading was -10 degrees F at Marysville, Marshall County, on the 5th. Records were set on both the cold and warm end of the spectrum. On the cold side, there were 7 new record low maximum temperatures and 7 new record low minimum temperatures. On the warm side, there were 22 new record high maximum temperatures and 17 new record high minimums.

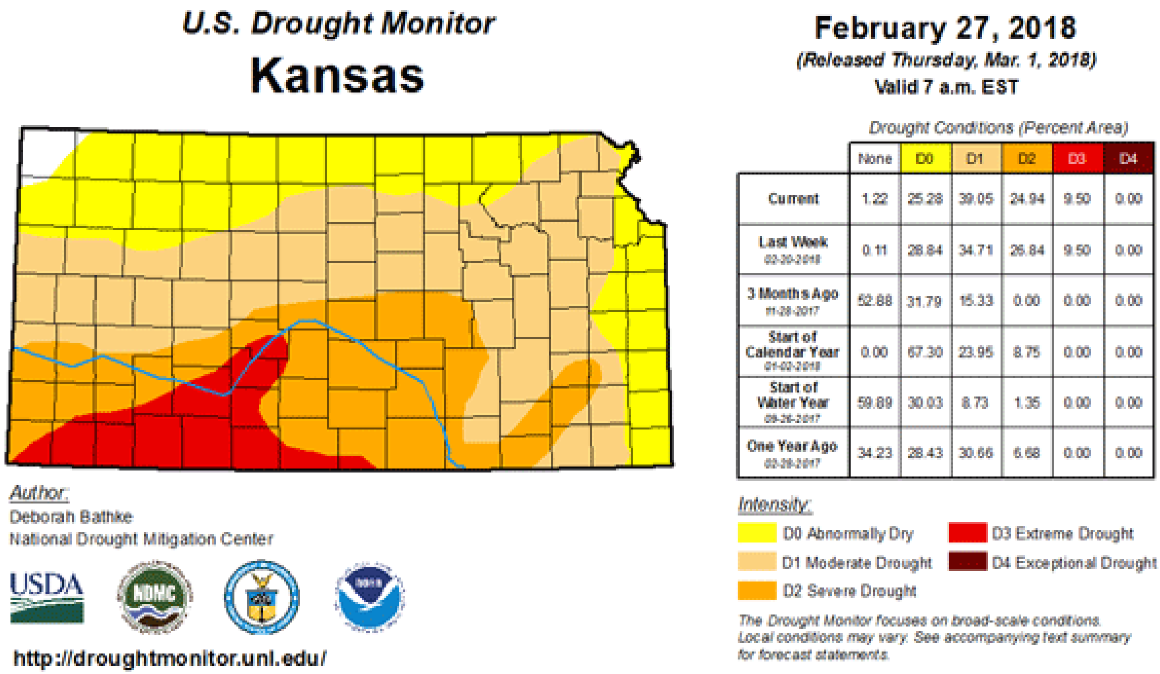




There were no severe weather reports during the month of February. In addition to several winter weather advisories, there were several days with extreme fire danger.

Drought conditions

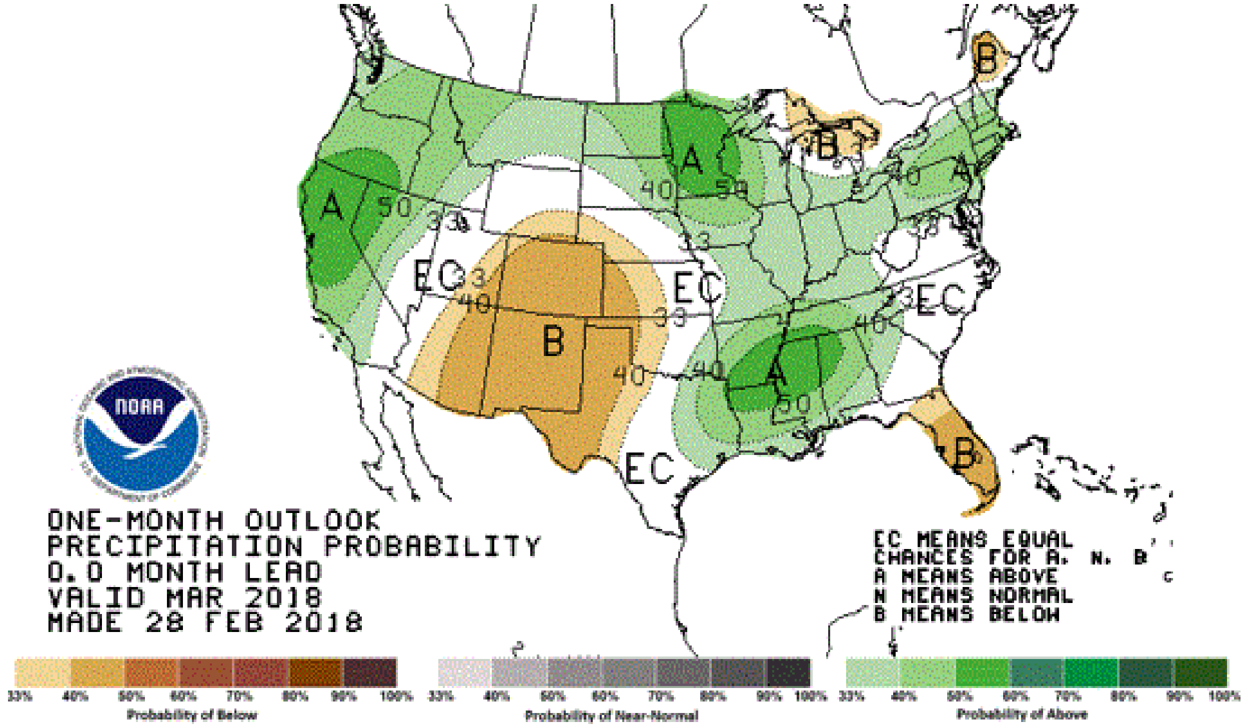
Extreme northwest Kansas saw improvement in drought status, due to the wet conditions in January and February. The rest of the state saw further deterioration. Extreme drought conditions now cover almost 10 percent of the state. Severe drought has expanded to a quarter of the state while moderate drought covers an additional 36 percent of the state.



	None	D0	D1	D2	D3	D4
Current	1.22	25.28	39.05	24.94	9.50	0.00
Last Week 02-20-2018	0.11	28.84	34.71	26.84	9.50	0.00
3 Months Ago 11-28-2017	52.88	31.79	15.33	0.00	0.00	0.00
Start of Calendar Year 01-02-2018	0.00	67.30	23.95	8.75	0.00	0.00
Start of Water Year 09-26-2017	59.89	30.03	8.73	1.35	0.00	0.00
One Year Ago 02-28-2017	34.23	28.43	30.66	6.68	0.00	0.00

March weather outlook

The March outlook has a slight chance for drier-than-normal conditions state wide, with an increased chance of warmer-than-normal temperatures. Since March is a critical transition month, that combination is likely to result in further deterioration of the drought conditions. With the wet summer in 2017 and current dryness, increased fire danger continues.



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February 2018										
Kansas Climate Division Summary										
	Precipitation (inches)						Temperature (°F)			
	February 2018			January through February					Monthly Extremes	
Division	Total	Dep. [1]	% Normal	Total	Dep. [1]	% Normal	Ave	Dep. [1]	Max	Min
Northwest	0.16	-0.38	28	0.44	-0.55	43	26.7	-5.0	78	-7
West Central	0.20	-0.39	36	0.42	-0.68	41	29.3	-3.8	79	-1
Southwest	0.02	-0.53	2	0.21	-0.81	21	33.4	-2.2	80	0
North Central	0.32	-0.51	38	0.68	-0.78	48	27.3	-4.8	78	-8
Central	0.43	-0.58	45	0.72	-0.98	44	31.1	-3.1	79	-1
South Central	0.44	-0.72	33	0.61	-1.38	27	33.0	-3.5	78	4
Northeast	0.49	-0.63	43	0.81	-1.11	41	28.9	-3.4	74	-10
East Central	0.58	-0.75	39	1.23	-1.05	51	31.7	-2.0	76	-2
Southeast	1.99	0.27	109	2.57	-0.40	82	34.6	-1.9	78	2
STATE	0.53	-0.46	41	0.86	-0.87	43	28.8	-1.1	80	-9

1. Departure from 1981-2010 normal value

2. State Highest temperature: 80 °F at Ashland, Clark County, on the 15th and Tallgrass Prairie Park, Chase County, on the 19th.

3. State Lowest temperature: -10 °F at Marysville, Marshall County, on the 5th.

4. Greatest 24hr: 1.93 inches at Erie, Neosho County, on the 21st (NWS); 2.08 inches at Erie 0.3 N , Neosho County, on the 21st (CoCoRaHS).

Source: KSU Weather Data Library

Mary Knapp, Weather Data Library
mknapp@ksu.edu

7. Don't miss the K-State Soybean School at Phillipsburg on March 21

It's not too late to attend a K-State Soybean School this year. Due to inclement weather, the Soybean School originally scheduled for January 22 in Phillipsburg was rescheduled for **March 21, 2018.**

The one-day school will cover a number of issues facing soybean growers including: weed control strategies, production practices, nutrient fertility, and insect management.

March 21 – Phillipsburg, KS

Phillips County Fair Building, 1481 US-183
Cody Miller, Phillips-Rooks District, codym@ksu.edu, 785-543-6845

Lunch will be provided courtesy of Kansas Soybean Commission (main sponsor of the schools). The schools will also be supported by Channel Seeds. There is no cost to attend, however participants are asked to pre-register by **March 19**. Please re-submit your registration if you had signed up for the original date.

Online registration is available at: K-State Soybean Schools

You can also preregister by emailing or calling the local K-State Research and Extension office listed above.

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