



Extension Agronomy

eUpdate

12/08/2017

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. Sulfur deficiency in wheat

In recent years, sulfur (S) deficiency in wheat has become common in many areas of Kansas, particularly in no-till wheat. The likely reasons for this is a reduction in sulfur additions to the crop from atmospheric deposition (there is less S in the air now) and cooler soil temperatures as a result of no-till which slows S mineralization in the soil. Some crops in the rotation, such as soybean, can also take up significant amounts of S resulting in an S deficit for the following wheat crop.

Historically, S deficiency was most common on high-yielding crops grown on irrigated, sandy soils low in organic matter and subject to leaching. However, due to reasons discussed above, an increasing number of finer-textured soils have shown S deficiency in recent years.

Identification of S deficiency

The photos below are good representations of S deficiency in wheat. Generally S-deficient wheat is yellow and stunted and is observed in patches in the field, especially in areas where there has been previous soil erosion or soil movement (Figure 1). 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. Wheat in areas where topsoil was removed or significant cuts were made (i.e. terraced or leveled fields) also commonly shows symptoms.



Figure 1. Patches of sulfur deficiency in a wheat field. Photo by Dave Mengel, K-State Research and Extension.

Sulfur deficiency in growing crops is often mistaken for nitrogen (N) deficiency. However, unlike N deficiency where older leaves show firing and yellowing, with S deficiency, the pale yellow symptoms often appear first on the younger or uppermost leaves. Wheat plants with S deficiency eventually become uniformly chlorotic (yellow leaf tissue; Figure 2).



Figure 2. Close-up of sulfur deficiency in wheat. The wheat is exhibiting yellowing (chlorosis) which is a sign of insufficient sulfur. Photo by Dorivar Ruiz Diaz, K-State Research and Extension.

Sulfur deficiencies in wheat have 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 any available S (sulfate) accumulations. Deficiencies of S are often difficult to identify because the chlorosis is not always obvious. Crops lacking S also may be stunted, thin-stemmed, and spindly. In the case of wheat and other cereal grains, maturity is delayed. Winter annual weed competition is also enhanced due to the slower growth and lack of good tillering.

At present, many fields in north central and northeast Kansas 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.

Forms of sulfur in soil

The majority of S in soils is present in organic forms in surface soils and as sulfate (SO_4^{2-}), an inorganic form. Sulfate is relatively soluble, so it tends to leach down into the subsoil. In many of our Kansas soils, it will accumulate in the B horizon (subsoil) in two forms. Clay surfaces and coatings will retain some sulfate, and sulfate will also be present in the subsoil of many Kansas soils as gypsum (calcium sulfate).

Testing soil for sulfur

A soil test for available sulfate-S 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. Accurate estimates of S needs cannot be made from a surface sample alone. Since sulfate is mobile, sampling to a 24-inch depth is important. 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 levels by the test may not be available to wheat in the early spring, especially where soils are cold.

Choosing a fertilizer material

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. However, some of these products are best used in preplant applications.

Dry S-containing fertilizers:

- 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. This can be a slow process when surface-applied. As a result, elemental S is not well suited for corrective applications to S-deficient wheat in the spring, due to the time required for oxidation to sulfate.
- Ammonium sulfate, AMS (21-0-0-24S) is a dry material that is a good source of both N and S. However, it has high acid-forming potential and soil pH should be monitored. Ammonium sulfate is a good source to consider for either preplant or 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. However, gypsum is not as water soluble as many fertilizer materials such as ammonium sulfate.

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

Liquid S-containing fertilizers:

- Ammonium thiosulfate, ATS, (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, KTS, (0-0-25-17S) is a clear liquid product that can be mixed with other liquid fertilizers.

Topdressing with thiosulfate and UAN can be done early, before Feekes 5 growth stage (green up), and at temperatures below 70 degrees F. Be aware that some leaf burn may be expected with some of these liquid fertilizers. These products would be good sources for pre-plant application as well.

For more information see *Sulfur in Kansas*, K-State publication:
MF-2264, <http://www.ksre.ksu.edu/bookstore/pubs/MF2264.pdf>

For estimations of required application rates of S see *Soil Test Interpretation and Fertilizer Recommendations*, K-State publication MF-2586
<http://www.ksre.ksu.edu/bookstore/pubs/mf2586.pdf>

Dorivar Ruiz Diaz, Nutrient Management Specialist
ruizdiaz@ksu.edu

Dave Mengel, Soil Fertility Specialist (retired)

2. Update on winter wheat growth and development in Kansas

Relative to the historical sowing pattern for Kansas, about 65% of the wheat crop was sown late. Excessive moisture during late September – early October is the reason for the delayed sowing. In the majority of the cases this moisture led to a very good stand establishment which is extremely important in setting the crop's yield potential. However, very little precipitation has fallen since sowing across the majority of the state (Figure 1). In fact, a large portion of the wheat growing region in Kansas (central and western Kansas) received less than 0.35 inches of precipitation since November 1, and the southwest corner of the state received zero precipitation. To provide a historical perspective, this results in anywhere from - 0.6 to -3.15 inches departure from normal (Figure 2).

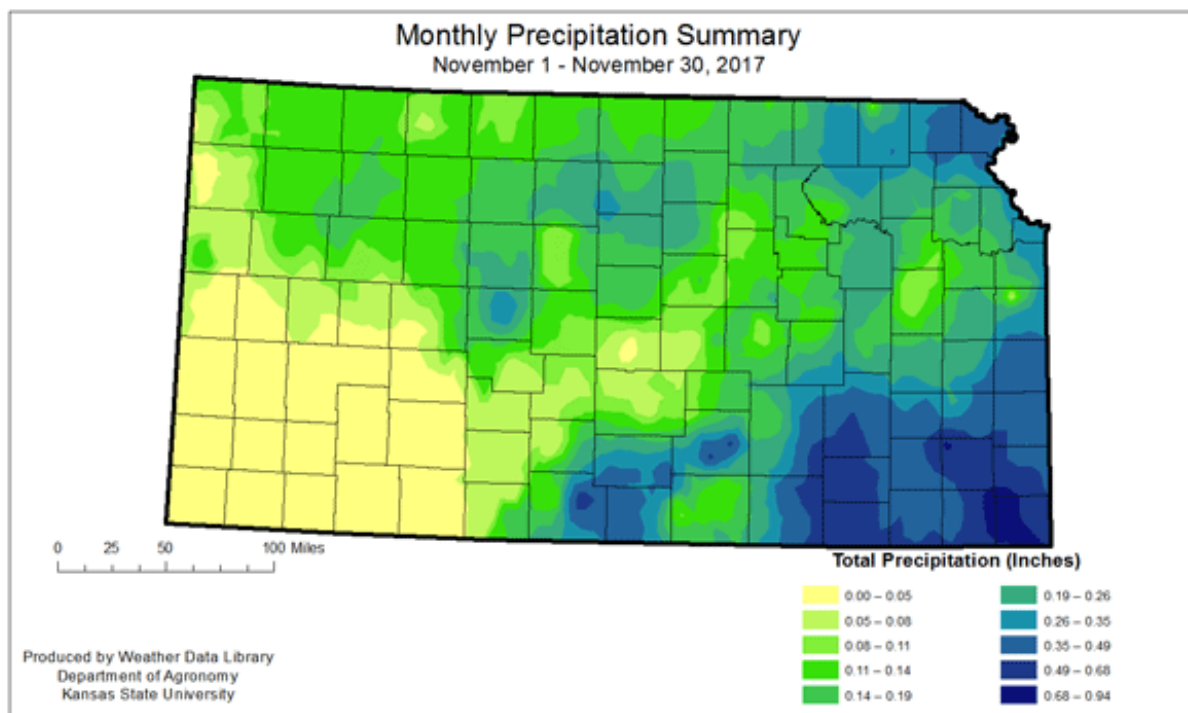


Figure 1. Monthly precipitation summary for Nov. 1 – Nov. 30 across Kansas.

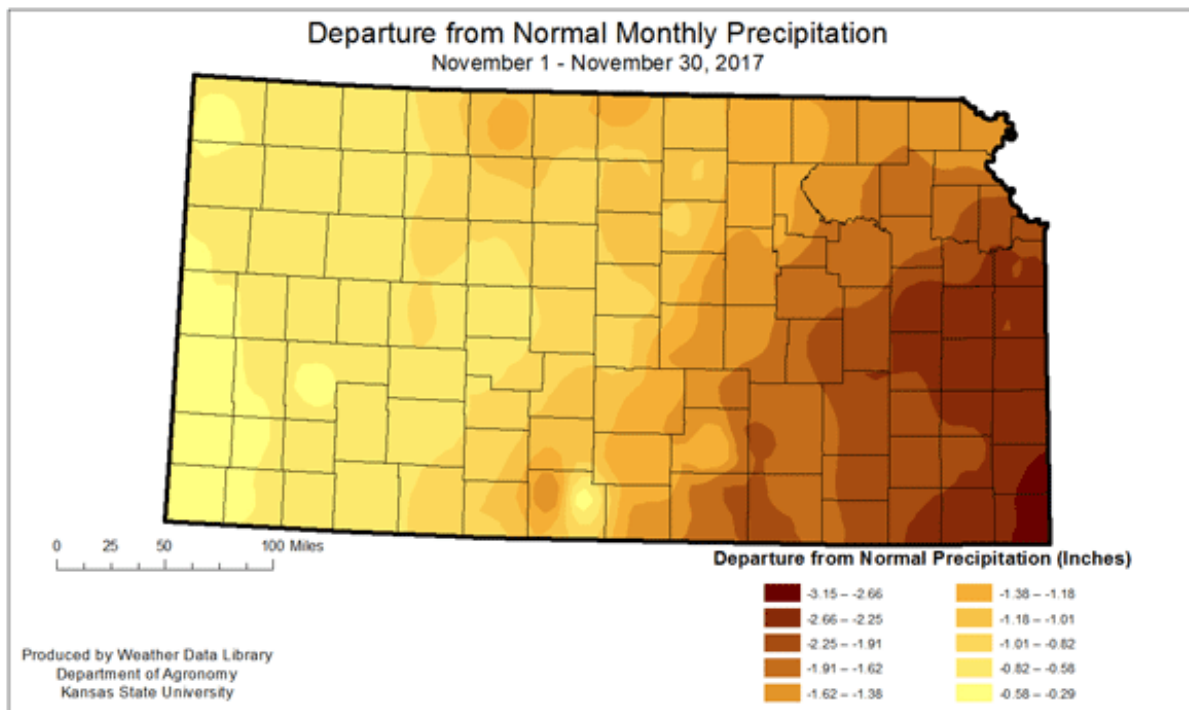


Figure 2. Departure from normal precipitation for Nov. 1 – Nov. 30 across Kansas.

Late sowing and dry fall implications

The late sowing coupled with a lack of significant precipitation in a large portion of the Kansas wheat growing region might bring challenges to the wheat crop, especially in making it through the winter (Figure 3). Dry conditions may reduce the soils ability to buffer temperature changes at the crown level. Additionally, late sowing and dry conditions might impact secondary root development, which would render the crop less winter-hardy.

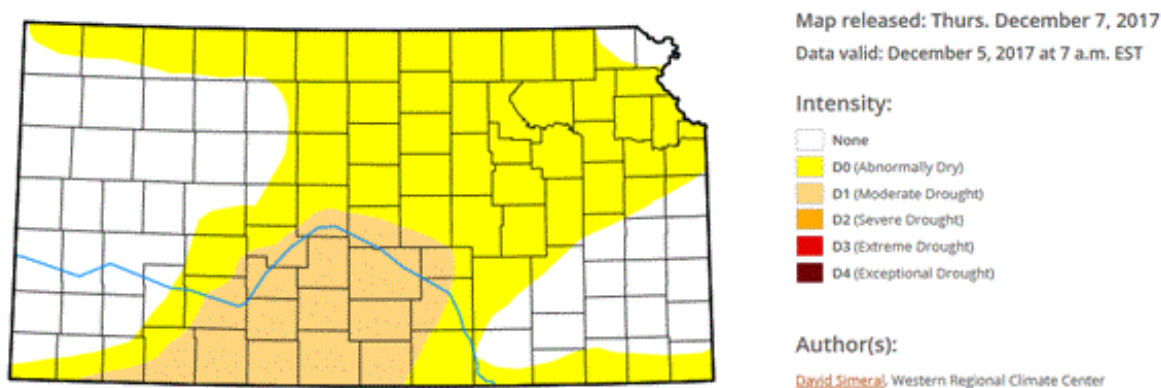


Figure 3. U.S. Drought monitor indication that most of the southwest/south-central region of Kansas is experiencing some level of drought stress. Source: <http://droughtmonitor.unl.edu/>

Late-planted wheat following a summer crop, or delayed by October moisture

In most regions of Kansas where wheat sowing was delayed due to early October precipitation, wheat is behind in development compared to the historical average. Many wheat fields in central and north central Kansas were delayed even further as producers finished summer crop harvest after the rainfall events. In these situations, it was not uncommon for producers to sow wheat after the first of November. This may not have provided the crop enough time to tiller during the fall. One example of such case is shown in Figure 4, where the upper panel reflects a crop sown in early October and the lower panel a crop sown in mid-to-late October. Both photos were taken in nearby fields in north central Kansas (west of Belleville). The better development of the early-October sown fields is apparent when compared to the later sown fields. Wheat needs at least 4-5 leaves and 1-2 tillers prior to winter dormancy for maximum cold tolerance. Wheat that has fewer tillers and leaves will be more susceptible to winter kill (Figure 5).



Figure 4. Upper panels reflect early October sown field (left) and plant (right) and lower panels reflect a wheat field (left) and plant (right) sown in the last ten days of October. Photos by Guilherme Bavia, assistant scientists, K-State Wheat and Forages Production Group.

Wheat planted early October



Wheat planted late-October

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

www.agronomy.ksu.edu | www.facebook.com/KStateAgron | www.twitter.com/KStateAgron

Figure 5. Differences in wheat growth and development as affected by planting date. Wheat planted late October showing no primary tillers (left), while wheat planted early October has started to tiller (right). Both crops still need significant fall growth to properly prepare for winter dormancy. Photo taken at the Agronomy North Farm, Manhattan, by Romulo Lollato, K-State Research and Extension.

What should producers look for?

Producers can assess the status of their wheat crop going into the winter in a few different ways. One important way is looking at the top growth and counting leaves and tillers. As mentioned previously, wheat needs at least 4-5 leaves and 1-2 tillers prior to winter dormancy for maximum cold tolerance. Wheat that has fewer tillers and leaves will be more susceptible to winter kill (Figure 5).

It is important to also look at the root system development (Figure 5). Roots coming out from the seed are called seminal roots and are used to take up water and nutrients throughout the entire growing season. There aren't very many of these roots so their contribution to overall water and nutrient uptake is limited. Crown roots are illustrated in Figure 6, right panel. Crown roots are the two white protrusions coming out of the white area about an inch above the seed in the right photo (early-October planting). These roots take up most of the water and nutrients needed by the plant, and they are very important for the plant to survive the winter. If cattle were grazing on this wheat, they would probably pull the plant out of the ground as there aren't many roots holding the plant in the soil yet. Consequently, this wheat crop still needs considerable fall growth prior to grazing or winter dormancy.

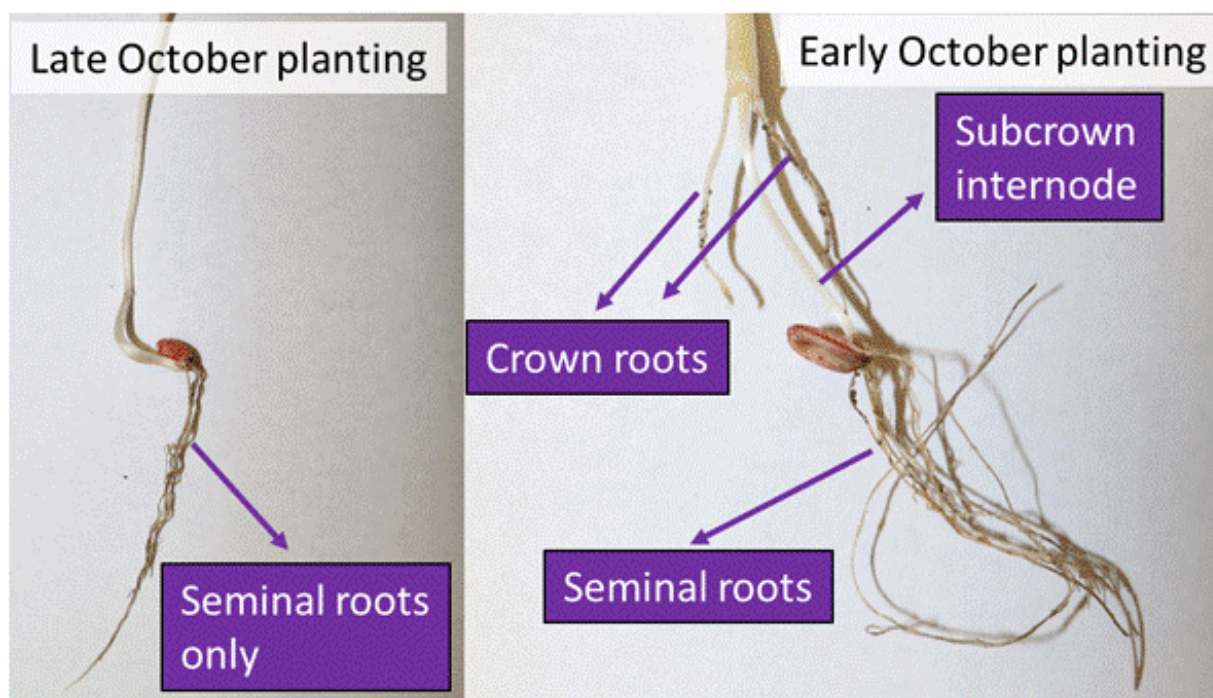


Figure 6. Seminal and crown roots development in wheat as affected by planting date. Both

rooting systems are developed enough to be grazed, and may be susceptible to nutrient deficiencies or desiccation damage over the winter if the crown roots develop further. Photos taken at the Agronomy North Farm, Manhattan, by Romulo Lollato, K-State Research and Extension.

The photos below illustrate various degrees of what you would like to see when you examine your wheat this fall.



Figure 7. Fall growth and development of wheat as affected by planting date. As expected, there is better canopy coverage with early-planted wheat for dual purpose (mid-September planting) as compared to wheat planted at the optimal planting time for grain only (mid-October planting). This does not necessarily mean the early-planted wheat is in better condition for winter. As long as the wheat planted in mid-October has 1-2 tillers and good crown root development (note Figure 8B below), the plants will have adequate growth going into winter. In addition to having adequate top growth and root development, factors such as the extent of the plants' cold hardening, variety differences in winter hardiness, soil moisture and temperature, and snow or plant residue protection on the soil surface will ultimately have an impact on winter survival. Photos by Romulo Lollato, K-State Research and Extension.

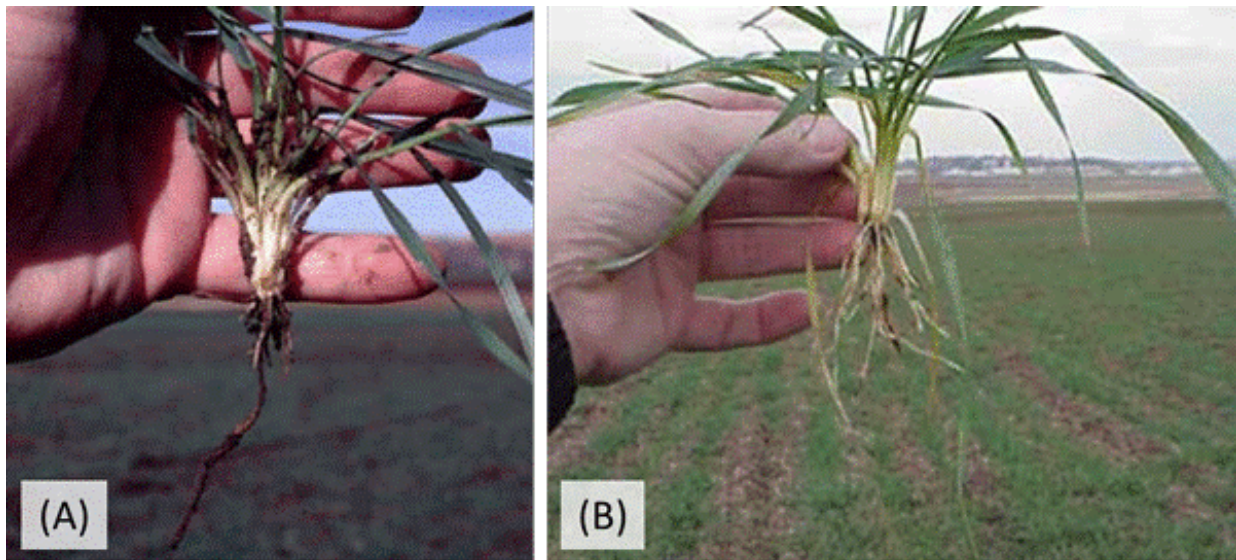


Figure 8. (A) Some of the crown roots are over one inch long. For this plant, a couple additional weeks of mild weather would allow for more root growth which would be desirable. (B) Ideal wheat above- and below-ground development before winter dormancy, with crown roots fully developed and able to provide water and nutrients to the plant. With this amount of crown root development, wheat plants should be well anchored. If cattle were grazing this wheat, they couldn't pull the plants out of the ground. Photos by Jim Shroyer, professor emeritus, K-State Research and Extension.

Romulo Lollato, Wheat and Forages Specialist
lolato@ksu.edu

Mary Knapp, Weather Data Library
mknapp@ksu.edu

3. Possible consequences of below-freezing temperatures to the Kansas wheat crop

The extent of possible freeze damage to the developing wheat crop will depend on several variables. Minimum air temperature is a leading factor in any possible winter injury, as is the duration of the minimum temperature. It is important to remember that the crown is protected by the soil during this stage, so factors other than air temperature need to be considered. Several factors will influence the crop's response to below-freezing temperatures at this stage:

- Crown insulation by the soil (influenced by seed-to-soil contact at sowing and depth of sowing)
- Crown root development
- Soil temperature and moisture status
- Amount of residue present (snow and/or crop)
- Degree of crop acclimation during the fall

With the majority of the wheat fields planted relatively late this season, there is concern for a lack of crown development.

How long were cold temperatures sustained?

The risk of freeze damage to wheat is a function of the minimum temperature and duration of time spent at potentially damaging temperatures. From December 6 – 8th, minimum temperatures below 15 degrees F were recorded throughout central and western Kansas. The number of hours below 15 degrees F varied according to geographical location within the state. Counties in southwest and north central Kansas were exposed to as many as 14 hours below 15 degrees F (Figure 1).

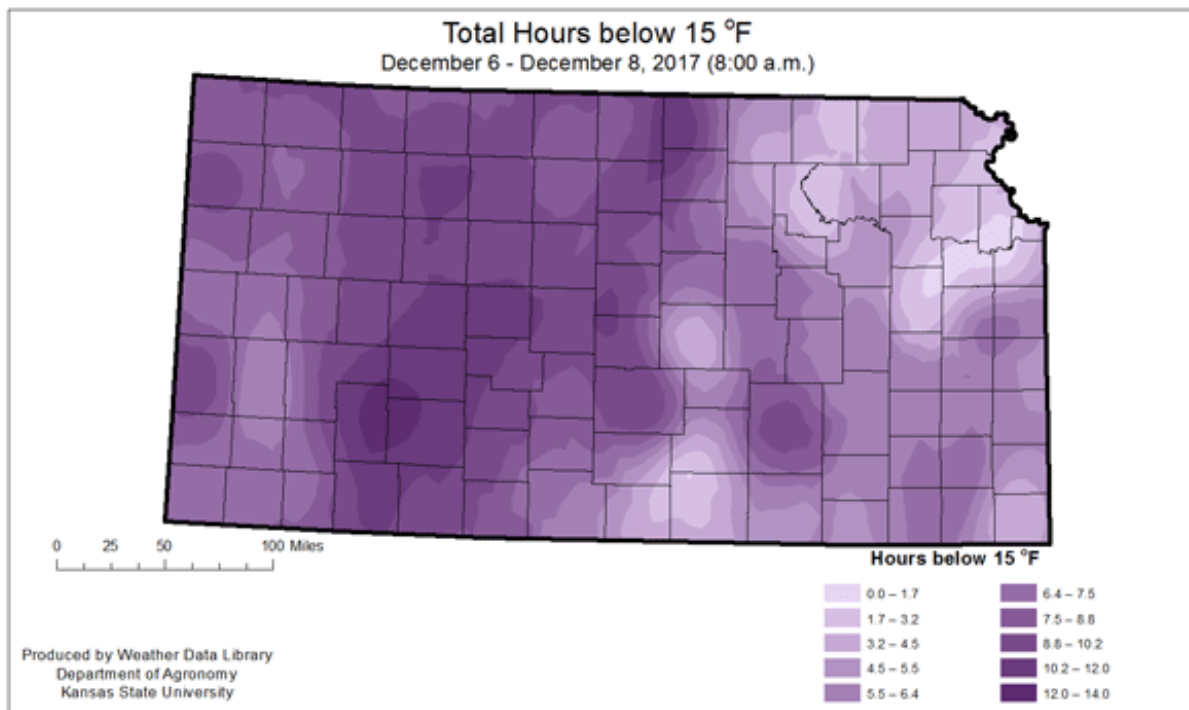


Figure 1. Total hours below 15 degrees F from December 6 – 8, 2017.

Soil temperatures

Freeze damage potential is a result of many interacting variables, however evaluating only air temperatures may not completely reflect the conditions experienced by the wheat crop. In this situation, soil temperatures can help determine the extent of the cold stress at crown level.

While air temperatures reached low levels and were sustained for several hours, soil temperatures at the 2-inch depth (slightly below where the wheat crown would normally be developed) were, on average, above 33 degrees F in northwest Kansas, and in most cases were between 41- 49 degrees F in other regions of the state (Figure 2). During the fall, most of the wheat winterkill occurs when temperatures reach single digits at the crown level. Higher soil temperatures may have helped buffer the cold air temperatures and minimized possible injury to the wheat crop.

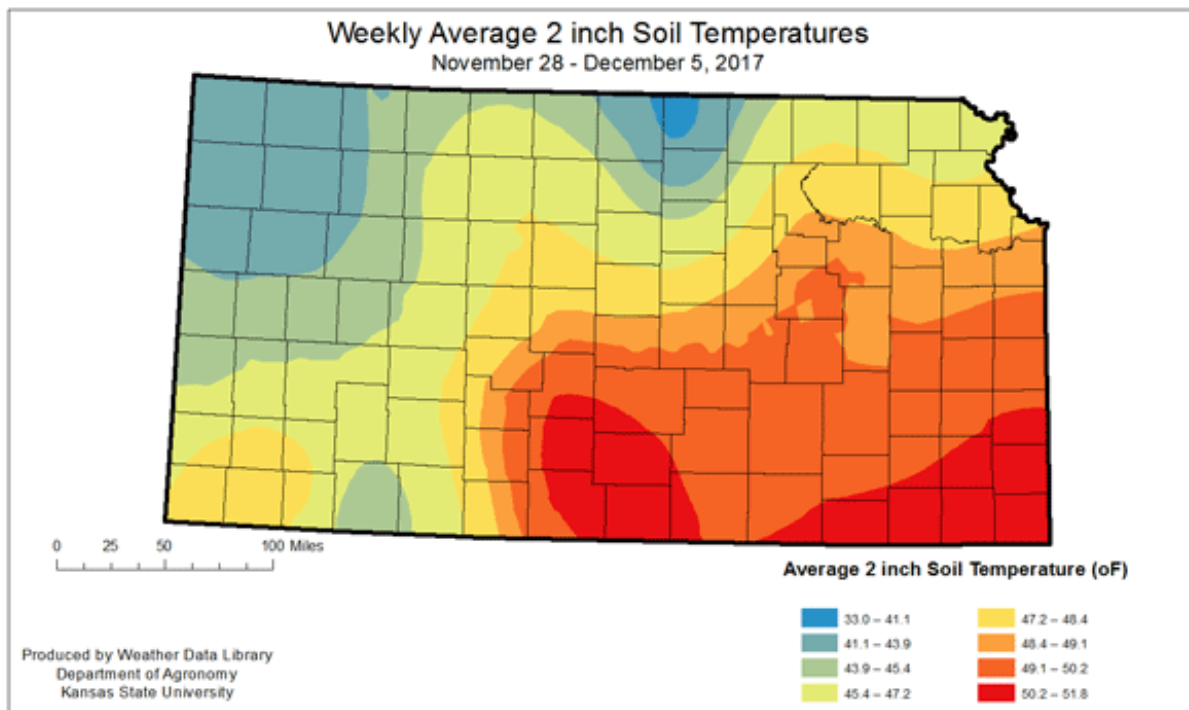


Figure 2. Average weekly 2-inch soil temperatures during November 28 – December 5, 2017.

Potential effects to the wheat crop

Southwest and north central Kansas recorded temperatures below 15 degrees F for the longest period of time in the state. In addition to the low temperatures, the majority of the wheat region in Kansas is under moderate drought stress, and has gone without significant precipitation for weeks. While the majority of the Kansas wheat crop should be okay after this cold snap, the lack of soil moisture decreases the capacity of the soil to buffer temperature changes. Therefore, while weekly average soil temperatures were above 30 degrees F, minimum temperatures at any given point in time could have been much colder. A dry soil will cool down faster than a moist soil, thus increasing the chances of low temperatures at the crown level. The circumstances for concern with the crop's ability to make it through these recent cold days include:

- i. Extremely dry soils with poor root development
- ii. Late-sown crops with delayed development (less than 4-5 leaves and 1-2 tillers)
- iii. Shallowly-sown fields where the crown is closer to the soil surface
- iv. Heavy-residue situations which may have precluded good seed soil contact

Other than the above circumstances, most of the damage at this stage should occur to leaf tissue, which might give the crop a rough look for a few weeks. The first apparent sign of freeze injury will be leaf dieback and senescence (death) (see Figure 3), which should occur across most of the state regardless of damage to the actual growing point. Existing leaves will almost always turn bluish-black after a hard freeze, and give off a silage odor. Those leaves are burned back and dead, but is not

a problem as long as newly emerging leaves are green. Provided that the growing point is not damaged, the wheat will recover from this damage in the spring with possibly little yield loss.



Figure 3. Leaf tip burn from freeze damage. By itself, this is cosmetic damage only. Photo by Romulo Lollato, K-State Research and Extension.

Romulo Lollato, State Wheat Extension Specialist
lolato@ksu.edu

Mary Knapp, Weather Data Library
mknapp@ksu.edu

4. Winter grain mites in wheat

There have recently been some reports of winter grain mites in wheat fields in Kansas. Winter grain mites are most prevalent on fields that have been dry. For now, growers should be scouting their fields and note any locations that have significant populations of winter grain mites so that they can monitor them in spring, especially if adequate moisture isn't received in the next few months.

For more information on control options, see K-State Research and Extension publication *Wheat Insect Management 2017*, MF-745 at: <https://www.bookstore.ksre.ksu.edu/pubs/MF745.pdf>

The following information about winter grain mites is from a K-State Entomology fact sheet: <http://entomology.k-state.edu/extension/insect-information/crop-pests/wheat/winter-grain-mite.html>

The winter grain mite is known to be a pest of small grains and grasses throughout the temperate regions of the world. Heavily infested fields take on a grayish or silvery cast as a result of the puncturing of plant cells as the mites feed. Many times the infested plants do not die, but become stunted and produce little forage or grain. Damage on young plants is more severe than on large, healthy plants.



Figure 1. Wheat plants stunted by winter grain mite feeding. Photo courtesy of Department of Entomology, K-State Research and Extension.



Figure 2. Wheat damage caused by winter grain mites. Photo courtesy of Department of Entomology, K-State Research and Extension.

Description

Winter grain mites have a dark brown to almost black body with conspicuous reddish-orange legs (Figure 3). Their front legs are longer than the others, but not as pronounced as on the brown wheat mite.

Winter grain mite – dorsal (top)



Winter grain mite – ventral (bottom)



Figure 3. Close-up photos of winter grain mite. Photo courtesy of Department of Entomology, K-State Research and Extension.

Life History

These mites generally have two generations per year. The first begins in September or October as weather conditions become favorable for the over-summering eggs to hatch. Populations reach a peak in December or January. The second generation develops from eggs laid by the first generation and reaches its maximum density in March or April. Populations then decrease as temperatures exceed the mite's range of tolerance. Females of the second generation lay over-summering eggs. Larvae become active soon after hatching and begin to feed on the leaf sheaths and tender shoots near the ground. The nymphs, as well as the adults, feed higher up on the plants at night and on cloudy or cool days.

As the sun rises, the mites descend the plants and seek protection on the moist soil surface under the foliage during the hot part of the day. Mites damage plants by puncturing individual cells, which cause the leaves to take on a silvery-gray appearance. Heavily damaged leaves will have brown leaf tips. If the soil is dry and there is little foliage cover, mites will crawl into the soil in search of moisture and cooler temperatures.

Temperature and moisture are the most important factors influencing mite development and abundance. Cool, rather than warm, temperatures favor their development. Activity of these mites is the greatest between 40 and 70 degrees F. Over-summering eggs do not hatch in the fall until rains provide adequate moisture. On hot, dry days it may be necessary to dig into the soil to a depth of 4

or 5 inches to find the mites. The mites do not seem to be harmed by high humidity, rainfall, short periods of sleet or ice cover, or by ground frozen to a depth of several inches in the fall. However, heavy spring rains may cause mite populations to disappear.

Fields with loose, sandy or loamy soils are more at risk than those with hard, clayey soils. Significant infestations are more common in central Kansas. Because fall populations develop from eggs laid the previous spring, problems are worse in continuous wheat. Crop rotation is helpful in reducing problems, although field borders may be affected when mites migrate from wild grasses. Control may be necessary if large portions of a field show symptoms and mites appear abundant relative to the amount of plant growth. Persistent dry conditions can lead to cumulative damage and plant recovery is often dependent on available moisture.

Jeff Whitworth, Extension Entomology
jwhitwor@ksu.edu

Holly Schwarting, Entomology Research Associate
holly3@ksu.edu

5. Wildland potential fire outlook for winter 2017-18

The National Significant Wildland Fire Potential Outlook is intended as a decision support tool for wildland fire managers, providing an assessment of current weather and fuel conditions and how these will evolve in the next four months. The objective is to assist fire managers in making proactive decisions that will improve protection of life, property and natural resources, increase fire fighter safety and effectiveness, and reduce firefighting costs.

The significant wildland fire potential forecasts included in the National Significant Wildland Fire Potential Outlook represent the cumulative forecasts of the ten Geographic Area Predictive Services units and the National Predictive Services unit.

For the months of December thru March this National Outlook highlights much of the southern portions of Kansas as having above-normal significant large fire potential (Figure 1). Above-normal potential means a greater-than-usual likelihood that significant wildland fires will occur. Significant wildland fires are those requiring mobilization of resources beyond the typical local response area.

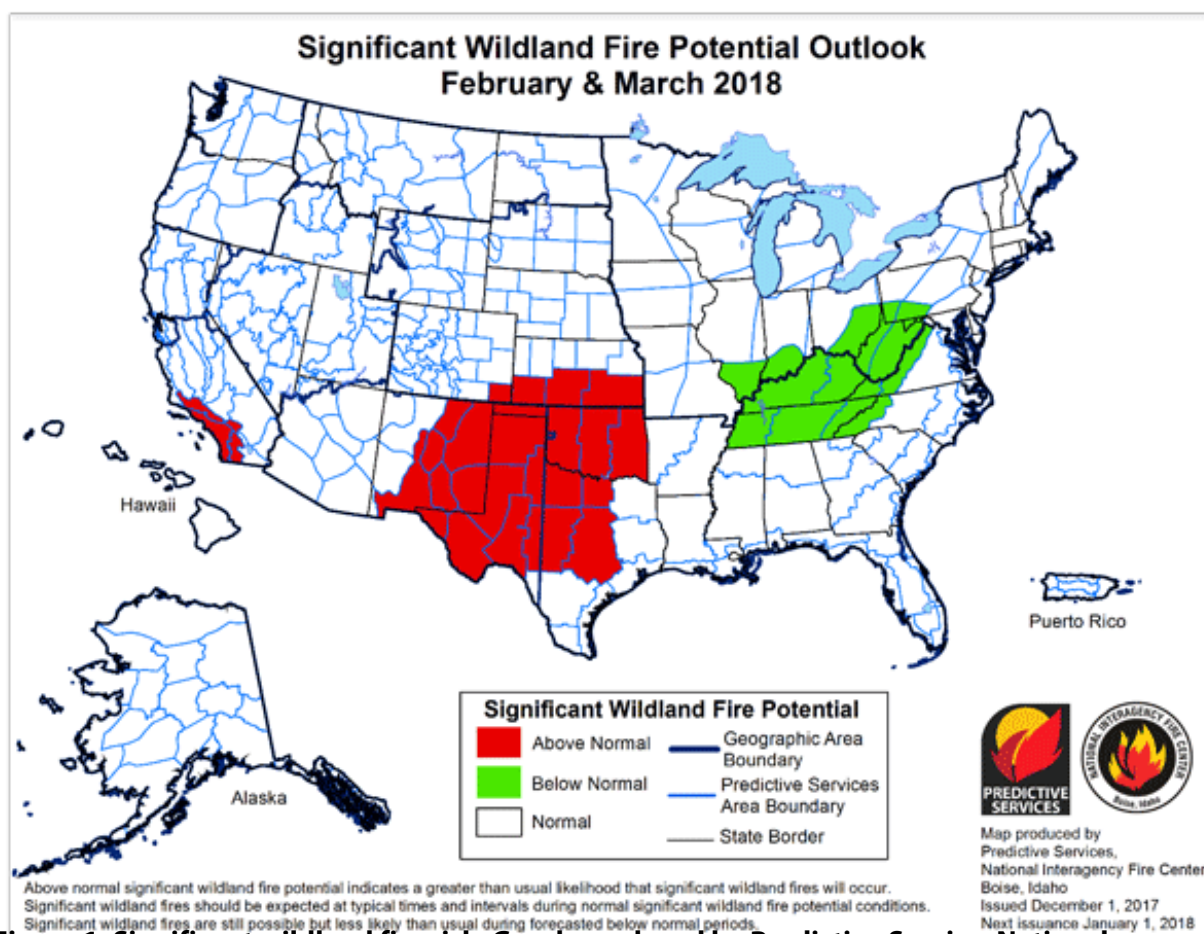


Figure 1. Significant wildland fire risk. Graph produced by Predictive Service, National Interagency Fire Center.

Chip Redmond, meteorologist with the K-State Mesonet and an Incident meteorologist, helps explain the concern, "Some parts of Kansas, especially the south central and southwest areas, saw above-normal moisture during the growing season, with many reports of large to significant fuel loads as a result. Areas south of US-50 have seen considerable drying during the previous month with many locations exceeding 60 days without a wetting rain. This, combined with recent above-normal temperatures, sunny skies, and breezy winds, are rapidly depleting any remnant moisture." According to Redmond, "while this is not unusual for this time of year, any deficit developed will be very difficult to overcome without a period of above-normal moisture between now and March. It is our desire to make interested parties aware that these elements are lining up for the upcoming season, even if we do obtain a period of above-normal precipitation in the meantime. Regardless, with recent forecasts of mid-to-long range dryness continuing, we are setting the stage for some large fires in Kansas with heavy fuel loading and flash-type drought."

Growing Season Precipitation

Precipitation received during the growing season, April to September, is a determining factor for the upcoming fire season (Figure 2). The previous two years received above-normal precipitation (2016:124% and 2015:105% compared to normal statewide) which contributed to large fires the following winters. However, in 2017, the growing season was characterized by slightly below-normal precipitation (98% of normal) overall. This is partly due to the dry months of June and September. Despite those deficits, April (174%) and May (111%) were significantly wetter-than-normal. Therefore, despite a marginally drier period in 2017, the timing of the moisture was critical for supplying ample grass and fuel growth the remainder of the period.

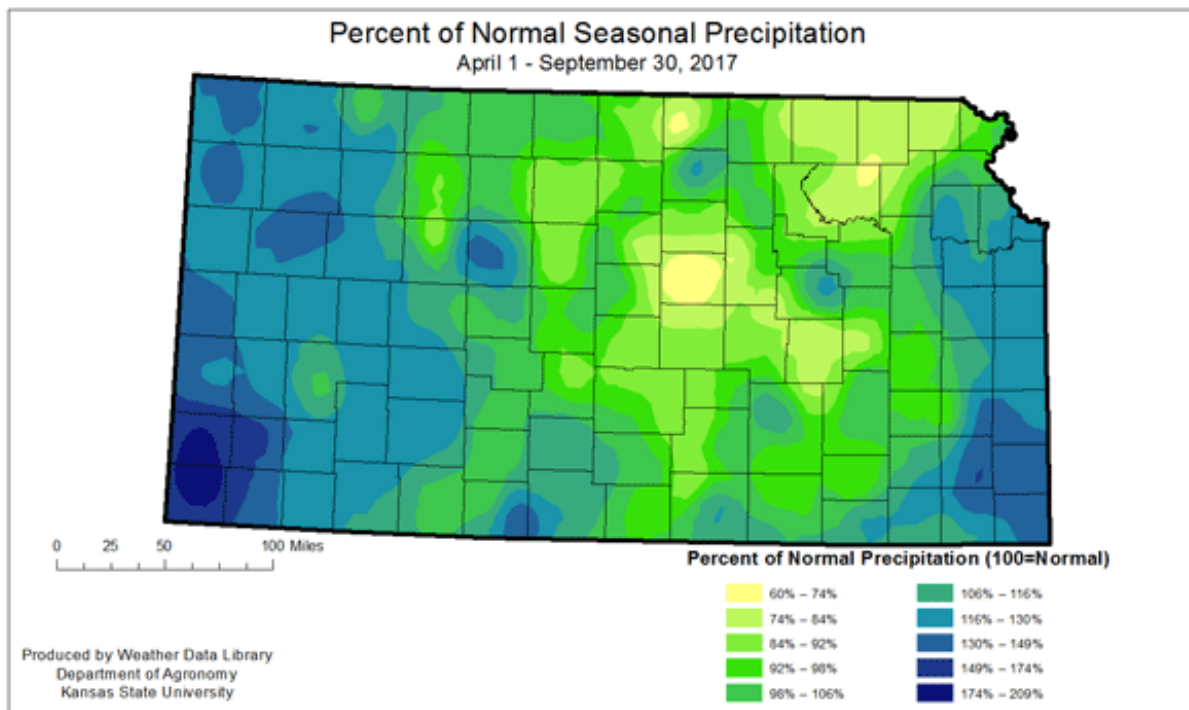


Figure 2. Percent of normal precipitation for April-September, 2017.

This increased fuel load is a large concern for the next few months which are typically the driest period of the year for Kansas. With any strong system, the potential exists for large fires similar to what we have seen the last two years.

Current and Future Weather

Much of Kansas began to dry out in September. Some places in western Kansas haven't received even 0.1 inch of rain in over 60 days. Above-normal temperatures for much of November combined with gusty winds have caused surface moisture to rapidly evaporate. As a result, drought conditions are beginning to expand across much of Kansas. According to the Drought Monitor, nearly half the state is considered "D0 – Abnormally Dry" and another 15% in "D1 – Moderate Drought".

Long-term forecasts suggest the dry period will continue through much of December (Figure 3). Fortunately, temperatures should be more seasonal (cooler) the remainder of the month. Unfortunately, the upcoming weather pattern is also associated with periods of very windy conditions associated with numerous dry, cold fronts.

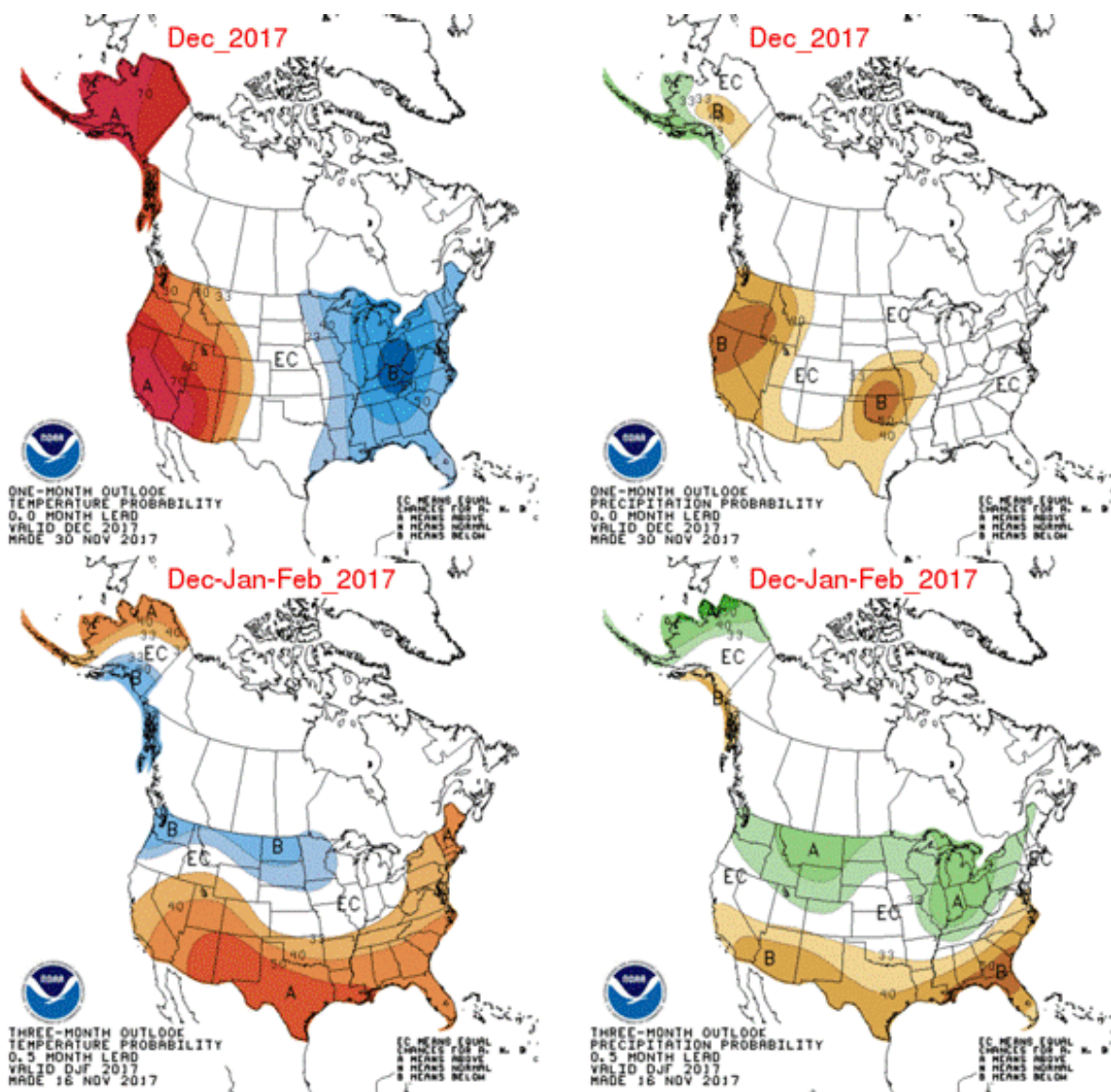


Figure 3. One month (December) and 3-month (Dec.-Feb.) temperature and precipitation outlooks issued by the Climate Prediction Center. Source: www.cpc.ncep.noaa.gov

Beyond December, trends are bit more difficult to discern. The January through March period is typically very dry in Kansas, averaging only 3.85 inches of total precipitation statewide. Any precipitation that does occur will only have short-term impacts on the dried out fuels until the arrival of spring rains. The biggest concern during the next few months will be the occurrence of very warm days. These are typically associated with very dry air and high winds in advance of a strong storm system. Kansas' largest wildfires are usually dependent on the shifting winds and the lack of moisture associated with these systems. Normally, Kansas will see several of these systems before one can eventually tap into the Gulf moisture and provide much needed rainfall.

Finally, the influence of precipitation type is also important. Snowfall can often knock down or flatten the standing grasses. This removes the vertical fuel load and can significantly decrease fire behavior. A lack of snowfall through December will continue to make these grasses available and lead to

suppression difficulties until a snowfall event occurs.

Jason Hartman, Fire Protection Specialist, Kansas Forestry
hartmanj@ksu.edu

Christopher "Chip" Redmond, Weather Data Library
christopherredmond@ksu.edu

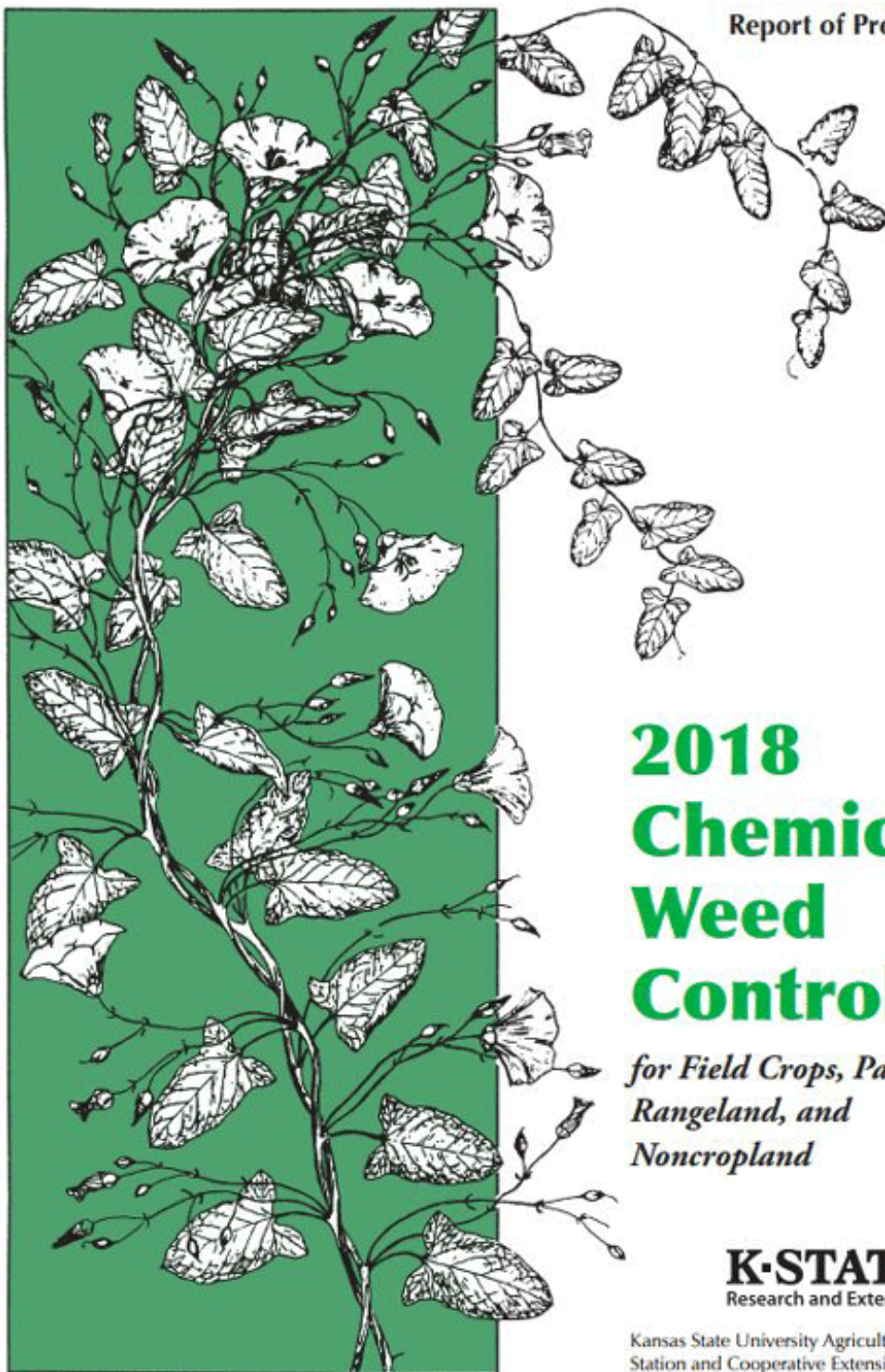
Mary Knapp, Weather Data Library
mknapp@ksu.edu

6. New K-State 2018 Chemical Weed Control Guide now available online

The new K-State 2018 Chemical Weed Control Guide is now available online at:

<https://www.bookstore.ksre.ksu.edu/pubs/chemweedguide.pdf>

Hard copies of this publication will be available soon.



2018 Chemical Weed Control

*for Field Crops, Pastures,
Rangeland, and
Noncropland*

K-STATE
Research and Extension

Kansas State University Agricultural Experiment
Station and Cooperative Extension Service

Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist
cthompso@ksu.edu

7. K-State Sorghum Schools scheduled for early February 2018



A series of three K-State Sorghum Production Schools will be offered in early February 2018 to provide in-depth training targeted for sorghum producers and key stakeholders. The schools will be held at three locations around the state.

The one-day schools will cover a number of issues facing sorghum growers: weed control strategies; production practices; nutrient fertility; and insect and disease management.

The dates and locations of the K-State Sorghum Production Schools are:

- **February 6** – Dodge City - Boot Hill Casino Conference Ctr., 4100 W Comanche St
Andrea Burns, Ford County, aburns@ksu.edu, 620-227-4542
- **February 7** – Hutchinson – Hutchinson Community College, 1300 N Plum St
Darren Busick, Reno County, darrenbusick@ksu.edu, 620-662-2371
- **February 8** – Washington – FNB Washington 101 C Street, Box 215
Tyler Husa, River Valley District, thusa@ksu.edu, 785-243-8185

Lunch will be provided courtesy of Kansas Grain Sorghum Commission. There is no cost to attend, but participants are asked to pre-register by January 31.

Online registration is available at: <http://bit.ly/KSSORGHUMSchools>

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

More information on the final program for each Sorghum School will be provided in upcoming issues

of the Agronomy eUpdate.

Ignacio Ciampitti, Cropping Systems Specialist
ciampitti@ksu.edu

Pat Damman, Kansas Grain Sorghum Commission
pat@ksgrainsorghum.org

8. 2018 K-State Soybean Schools

A series of three K-State Soybean Production Schools will be offered in late January 2018 to provide in-depth training targeted for soybean producers and key stakeholders. The schools will be held at three locations around the state.

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

The dates and locations of the K-State Soybean Production Schools are:

January 22 – Phillipsburg, KS

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

January 23 – Salina, KS

Webster Conference Center, 2601 North Ohio
Tom Maxwell, Central Kansas District, tmaxwell@ksu.edu, 785-309-5850

January 24 – Rossville, KS

Citizen Potawatomi Nation Center, 806 Nishnabe Trail
Leroy Russell, Shawnee Co., lrussell@ksu.edu, 785-232-0062

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 January 17.

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 for the location you plan to attend.



Ignacio Ciampitti, Crop Production and Cropping Systems Specialist
ciampitti@ksu.edu

Doug Shoup, Southeast Area Crops and Soils Specialist
dshoup@ksu.edu

Stu Duncan, Northeast Area Crops and Soils Specialist
sduncan@ksu.edu

9. 2018 Kansas Corn Management Schools



We are excited to announce the three regional 2018 Corn Management Schools.

Central Kansas: Monday, January 8, Hesston
AGCO building, 420 W. Lincoln Blvd

Western Kansas: Tuesday, January 9, Garden City
Clarion Inn, 1911 E. Kansas Ave.

Eastern Kansas: Thursday, January 11, Leavenworth
The Barn, 17624 Santa Fe Trail

Topics are focused on agronomic practices and research updates. Each school's sessions are designed to fit the farmers in the region. Topics include:

- Weed control
- Production Management
- Nutrient Management
- Insect update
- Disease update
- Planter technology update
- Corn marketing and price update
- Usable Corn Condition Progress Tools

Schools are free to attend thanks to the generous support of DuPont Pioneer and Kansas Corn. Lunch is included, so please pre-register online at: KScorn.com/Cornschoo

You can also register with KSRE local extension offices.

Hesston School:

Ryan Flaming, Harvey County, flaming@ksu.edu 316-284-6930
Zach Simon, Sedgwick County, zsimon@ksu.edu 316-660-0153
Darren Busick, Reno County, darrenbusick@ksu.edu 620-662-2371
Jake Renner, Kingman County, jwrenner@ksu.edu 620-532-5131
David Kehler, Butler County, dkeehler@ksu.edu 316-321-9660
Rickey Roberts, Marion County, rroberts@ksu.edu 620-382-2325
Shad Marston, McPherson County, smarston@ksu.edu 620-241-1523

Garden City School:

AJ Foster, Southwest Area Crops and Soils Specialist; anserdj@ksu.edu
Andrea Burns, Ford County, aburns@ksu.edu, 620-227-4542
Kurt Werth, Grey County, kwert@ksu.edu, 620-855-3821
Lacey Noterman, Haskell County, lnote@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

Leavenworth School:

Karol Lohman, Leavenworth County, klohman@ksu.edu, 913-364-5700
Jessica Barnett, Johnson County, Jessica.barnett@jocogov.org 913-715-7000
David Hallauer, Meadowlark District, dhallaue@ksu.edu, 785-863-2212
Ray Ladd, Atchinson County, clad@ksu.edu 913-833-5450
Roberta Wyckoff, Douglas County, rwycckoff@ksu.edu, 785-843-7058
Leroy Russell, Shawnee County, lrussell@ksu.edu, 785-232-0062
Darren Hibdon, Frontier District, dhibdon@ksu.edu, 785-229-3520
Abbie Powell, Marais des Cygnes District, abbie2@ksu.edu, 913-795-2829

For more information, contact:

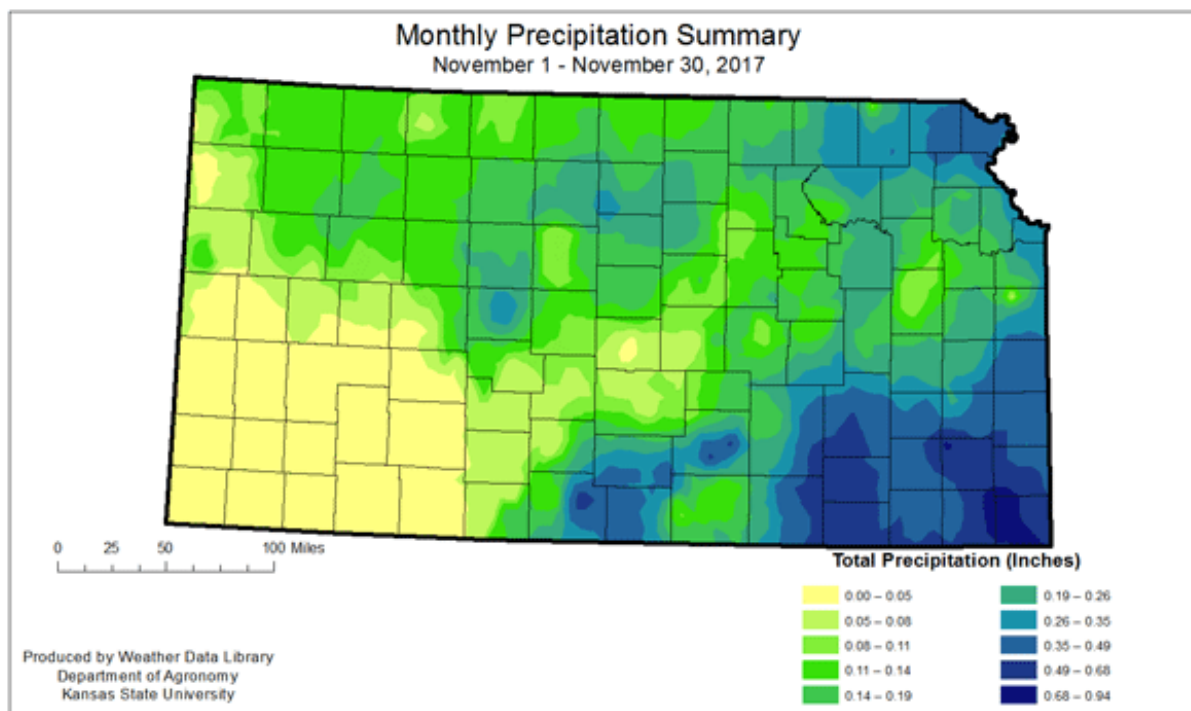
Stacy Mayo-Martinez, Kansas Corn Director of Industry Relations
smayo@ksgrains.com

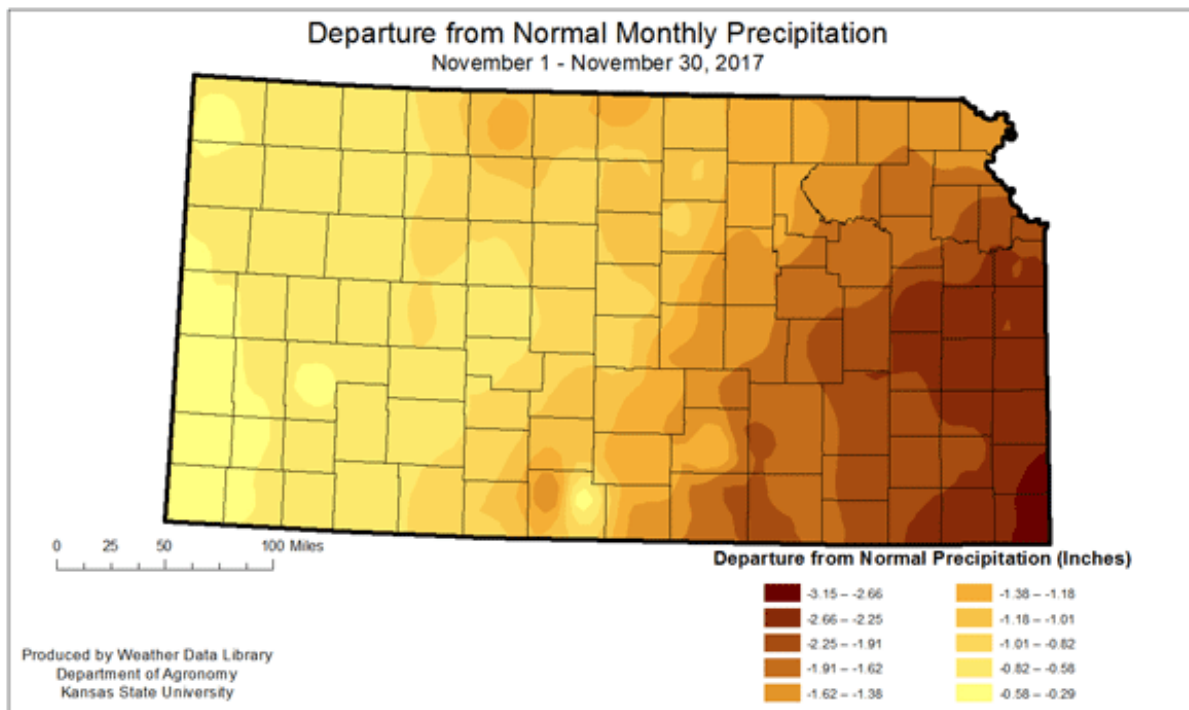
Ignacio A. Ciampitti, Crop Production & Cropping Systems Specialist
Ciampitti@ksu.edu

10. November weather summary for Kansas: Lack of rain predominates

A lack of precipitation dominated the month of November for Kansas. Statewide average precipitation was just 0.10 inches, which is a 3-way tie for the sixth driest November on record. The driest November on record was in 1989 when the statewide average precipitation was zero, and the greatest amount reported was just 0.01 inches. The Southeast Division had the highest average of 0.37 inches or 14 percent of normal. The Southwest Division ended November as the driest with an average of zero. Thanks to the wet conditions in the Southwest division in September, it is still at 99 percent of normal for the September through November period.

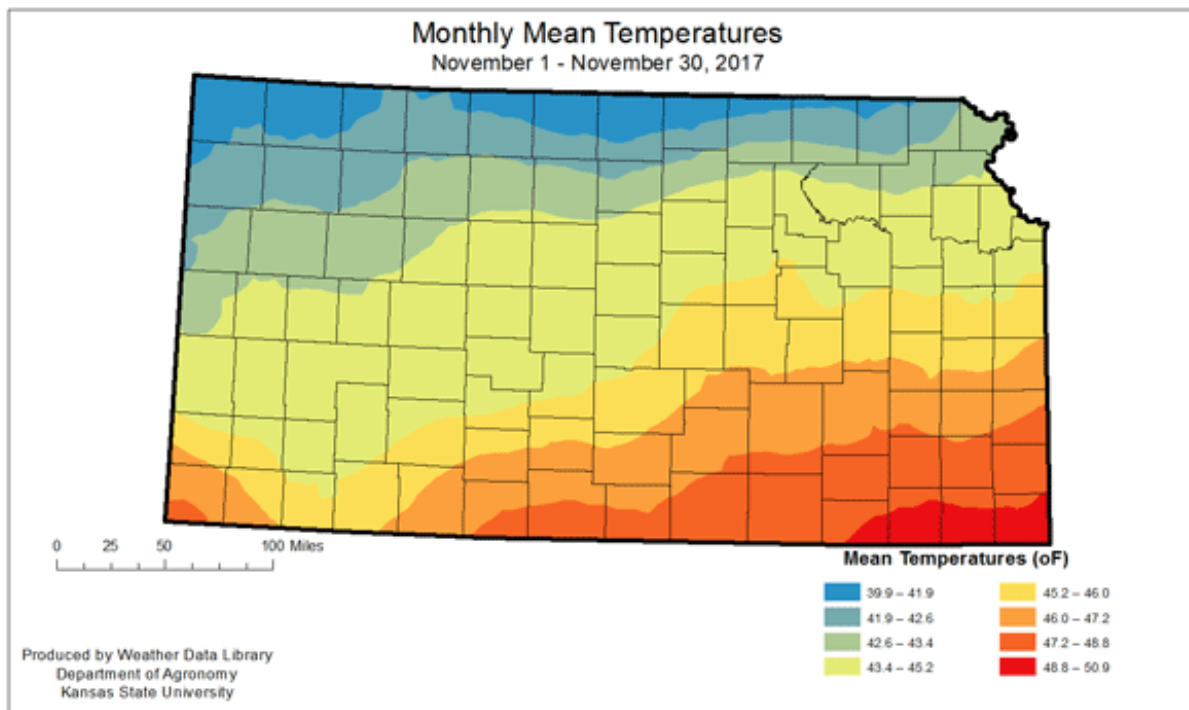
The greatest monthly precipitation total for a National Weather Service (NWS) reporting station was 0.88 inches at Coffeyville Waterworks, Montgomery County. The greatest monthly total for a Community Collaborative Rain Hail and Snow (CoCoRaHS) station was 0.77 inches at Wichita 4.5 ENE, Sedgwick County. The greatest 24-hour amounts were: 0.59 inches at Cedarvale 5SSE, Chautauqua County, on Nov. 29 (NWS); 0.64 inches at Beaumont 6.6 SSW, Butler County also on the Nov.29 (CoCoRaHS).





November ended on a warm note, pushing the statewide average to 44.2 degrees F or 1.6 degrees warmer-than-normal. That mark places it on the warm side of the distribution, and in a 7-way tie for the 36th warmest November since 1895. The warmest November on record occurred in 1999 when the statewide average temperature was 50.1 degrees F. There were 137 new record daily highs, one of which tied the monthly record high for the location (87 degrees F reported at Atwood, Rawlins County, on Nov.28). There were also 28 new record daily warm minimum temperatures. None of those set new records for the month.

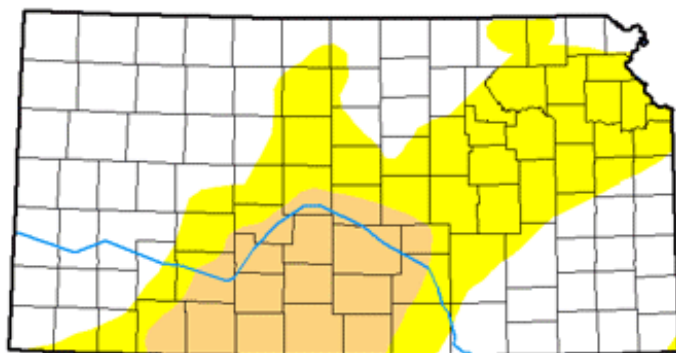
On the cold side of the scale, there were 6 new record low maximum temperatures and 4 new record low minimum temperatures during November. The warmest reading of the month was 86 degrees F at Salina Airport, Saline County, on the 24th. The coldest temperature for the month was 12 degrees F reported at Burr Oak and Mankato, both in Jewell County, on the 22nd.



Despite the warmth at the end of November, measurable snow was reported in early November. Five locations in north central Kansas set daily records for snowfall. The greatest snowfall report was 2.5 inches at Ellis, Ellis County, on the 1st. This Halloween storm was the only significant snowfall event during November.

Given the dry conditions, there were no severe weather reports for November. Much below-normal precipitation, coupled with warmer-than-normal temperatures resulted in a steep increase in drought conditions. The area of 'abnormally dry' to 'moderate drought' increased by 33 percent in November. The December outlook calls for drier-than-normal conditions statewide. Given the low amount of moisture historically seen in December, improvement in the current drought status is not likely. With the wet summer and current dryness, increased fire danger is likely. See the accompanying article in this eUpdate, *Wildland potential fire outlook for winter 2017*, for more information on fire risks.

U.S. Drought Monitor Kansas



Author:

David Simerai
Western Regional Climate Center



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

November 28, 2017

(Released Thursday, Nov. 30, 2017)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0	D1	D2	D3	D4
Current	52.88	31.79	15.33	0.00	0.00	0.00
Last Week 11-21-2017	65.88	32.74	1.38	0.00	0.00	0.00
3 Months Ago 08-29-2017	62.50	17.60	19.90	0.00	0.00	0.00
Start of Calendar Year 01-03-2017	17.31	51.98	17.13	13.58	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 11-29-2016	47.46	22.03	20.00	10.50	0.00	0.00

Intensity:

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

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

Kansas State University Department of Agronomy

2004 Throckmorton Plant Sciences Center | Manhattan, KS 66506

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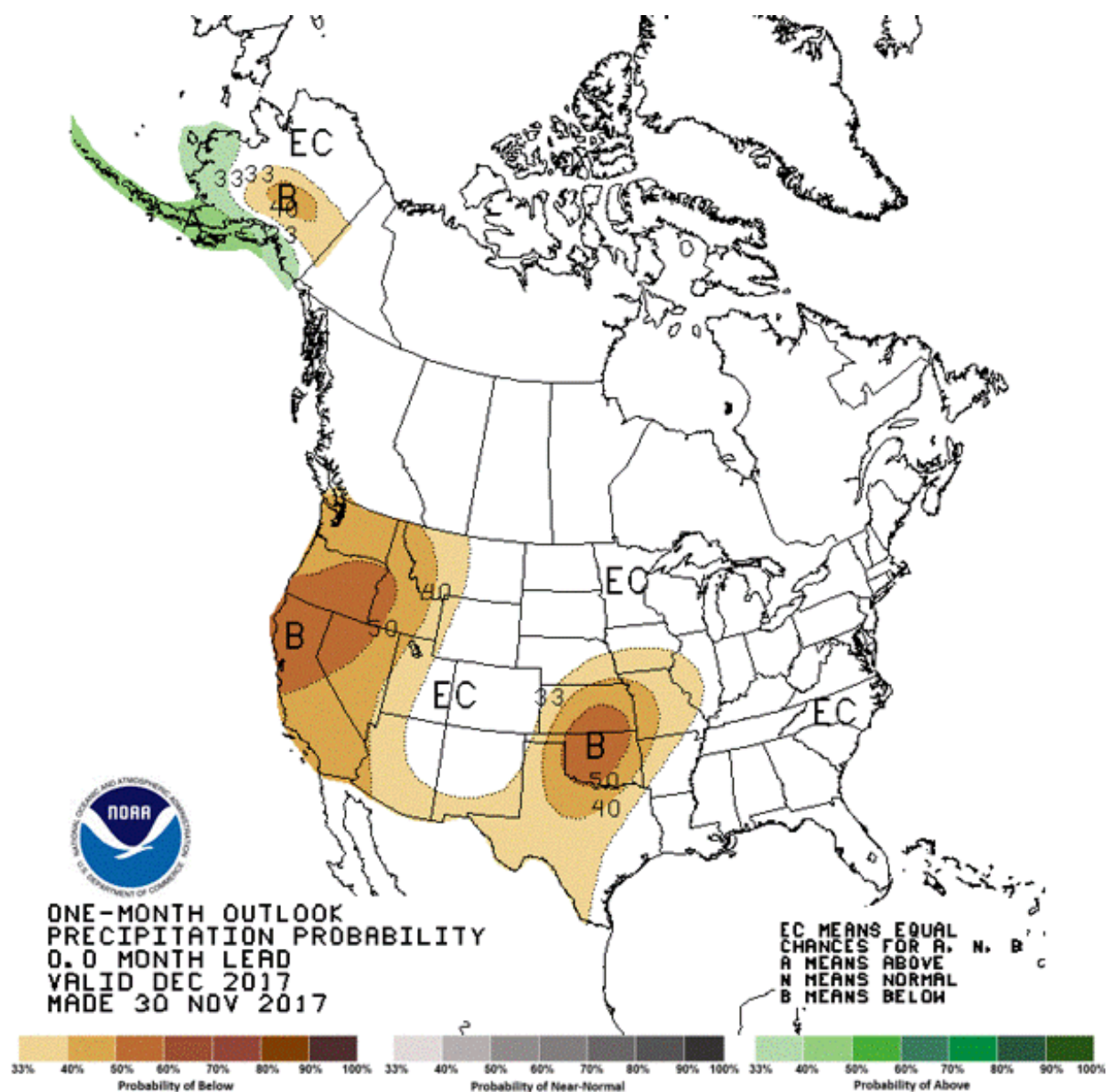


Table 1 Nov-2017 Kansas Climate Division Summary										
	Precipitation (inches)						Temperature (°F)			
	Nov-2017			2017 through November			Ave	Dep. 1	Monthly Extremes	
Division	Total	Dep. 1	% Normal	Total	Dep. 1	% Normal			Max	Min
Northwest	0.01	-0.81	1	20.35	-0.44	97	42.0	2.6	86	15
West Central	0.03	-0.76	3	23.24	3.10	115	43.5	2.9	86	17
Southwest	0.00	-0.66	0	24.32	5.09	127	45.8	2.8	86	16
North Central	0.06	-1.17	4	26.23	-0.93	96	42.3	1.1	85	12
Central	0.09	-1.15	7	25.94	-2.42	92	44.2	1.4	87	13
South Central	0.13	-1.36	8	31.16	0.96	103	45.9	1.3	84	16
Northeast	0.09	-1.68	5	29.17	-4.61	86	42.2	0.0	79	13
East Central	0.11	-2.06	5	32.87	-3.65	88	44.5	0.9	79	15
Southeast	0.37	-2.22	14	41.18	1.50	103	47.1	1.2	80	18
STATE	0.10	-1.32	5	28.56	0.21	102	44.2	1.6	86	12
1. Departure from 1981-2010 normal value										
2. State Highest temperature: 87 °F at Salina Airport, Saline County, on the 24th.										
3. State Lowest temperature: 12 °F at Burr Oak and Mankato, Jewell County, on the 22nd.										
4. Greatest 24hr: 0.59 inches at Cedarvale 5SSE, Chautauqua County, on the 29th (NWS); 0.64 inches at Beaumont 6.6 SSW, Butler County on the 29th (CoCoRaHS).										
Source: KSU Weather Data Library										

Mary Knapp, Weather Data Library
mknapp@ksu.edu