



Extension Agronomy

eUpdate

10/14/2016

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, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Below-freezing temperatures in parts of Kansas could affect some sorghum, soybeans	3
2. Timing of cheatgrass herbicides on wheat.....	5
3. Diplodia ear and stalk rot.....	6
4. Expected number of days to harvest summer crops in Kansas.....	12
5. October tornadoes in Kansas.....	22
6. Comparative Vegetation Condition Report: October 4 - 10.....	25

1. Below-freezing temperatures in parts of Kansas could affect some sorghum, soybeans

Temperatures fell below freezing in parts of Kansas on Oct. 13 (Figure 1). Temperatures were well below freezing in north central Kansas and some areas of the central section of Kansas. This situation will shorten the grain filling period for grain sorghum that is not yet mature, and impact immature soybeans, which could be an issue especially for double crop or late-planted beans.

Low temperatures on Oct. 13 were close to or above 40 degrees F in the southern part of the state.

As discussed in an [article in last week's Agronomy eUpdate](#), the risk of damage to summer row crops is a function of the current developmental stage of the crop as well as the minimum temperature and the duration of the cold temperatures.

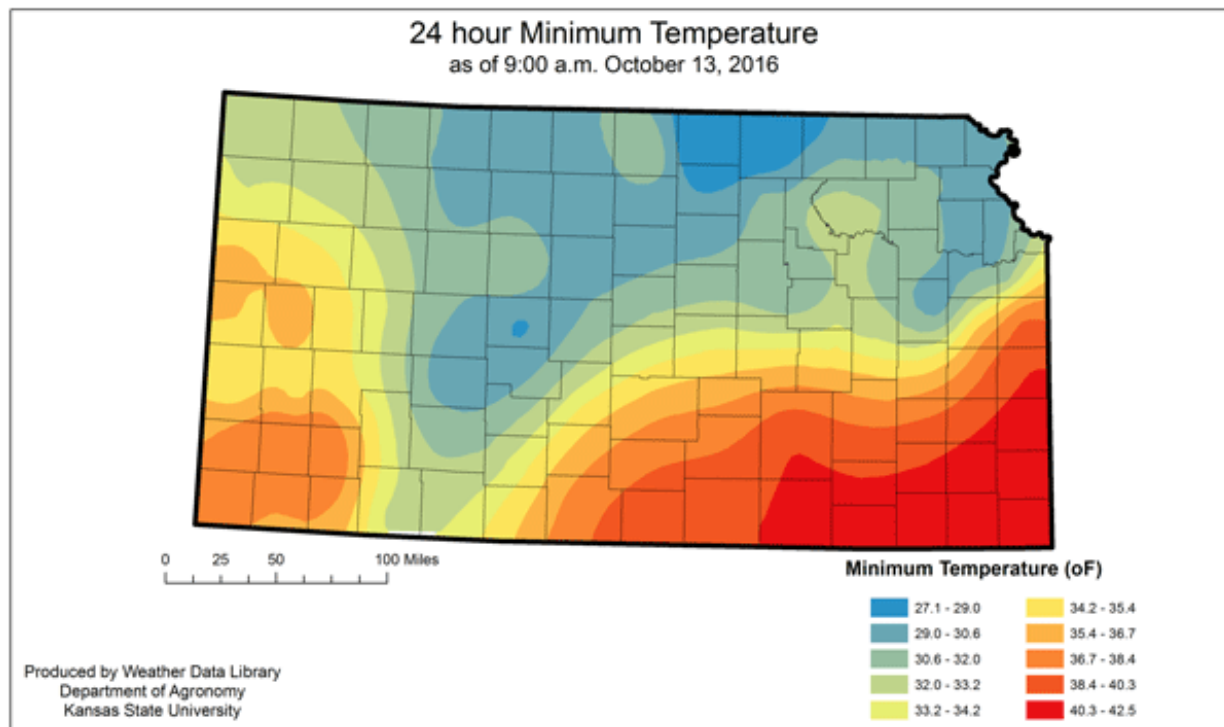


Figure 1. Lowest minimum temperatures measured on October 13.

The coldest temperatures on Oct. 13 were observed in the north central part of Kansas, with a duration of more than 4 hours (Figure 2). The freeze also extended to central and western areas of the state and also east to the counties of Republic, Marshall, Nemaha, Clay, Riley, Brown, and Doniphan. The duration of the sub-freezing temperatures varied from 2 to more than 4 hours.

For double crop or late-planted soybeans, exposure to temperatures below 32 degrees F will end grain filling if not yet mature, affecting test weight and seed quality (primarily protein levels). As the crop approaches maturity, the impact of a freeze event on soybean yields declines.

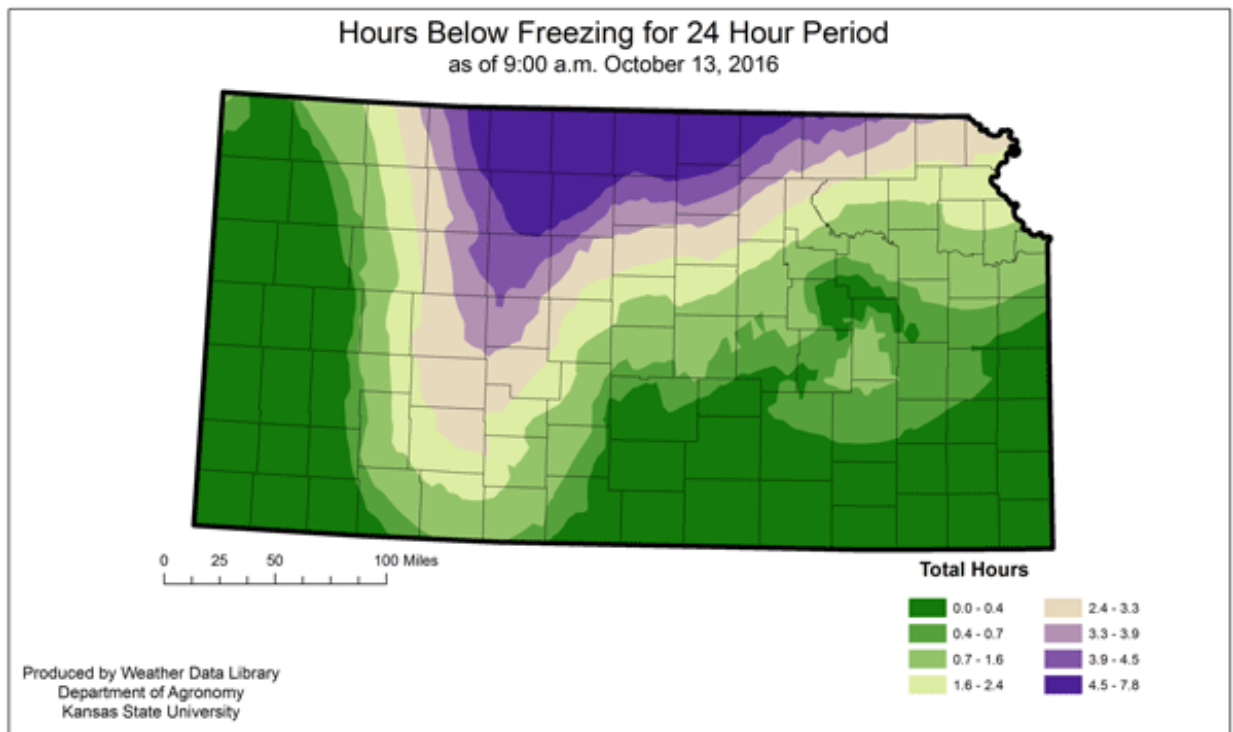


Figure 2. Total hours of air temperatures below 32 degrees F measured on October 13.

For grain sorghum, just more than 50% has reached maturity in the North Central District. Therefore, the probability of some sorghum being impacted and yields affected is high for this area. Temperatures below 32 degrees F will interrupt grain filling, impacting seed size (test weight) and seed quality, and make the harvest process more difficult (slowing the drying down process). A freeze at the soft- or hard-dough stage (before grain matures) will result in lower weight and chaffy seeds.

As with soybeans, the impact of a freeze event on grain sorghum yields declines as the crop approaches maturity.

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2. Timing of cheatgrass herbicides on wheat

Producers who want to treat their wheat fields with a cheatgrass herbicide have to decide when to apply it. Should they spend the money and apply it this fall or wait until spring to see if the wheat is going to yield enough to pay for it?

Each of the most commonly used cheatgrass herbicides – PowerFlex, Olympus, and Beyond (Clearfield wheat only) – is most effective on cheatgrass when applied in the fall, especially for control of downy brome. They can also be effective when applied in winter if the cheat is actively growing, or in the early spring. But control is most consistent when applied in the fall. These products generally should be applied when the cheatgrass is small and actively growing, and when the wheat has at least three leaves but prior to jointing.

Another benefit of fall application compared to spring application is that a fall application helps minimize rotational restrictions because of the extra time between application and planting the next crop. Fall application may even open the door for double-cropping or planting failed acres to soybeans in the spring following PowerFlex or Olympus.

The cheatgrass species present is a very important factor in the level of control to expect. All the listed herbicides can provide very good control of true cheat and Japanese brome (unless the weed population has developed resistance to the ALS class of herbicides), but are less effective on downy brome. ALS-resistant cheat and Japanese brome were first documented in Kansas in 2007. ALS-resistant cheatgrass first appeared in fields with a long history of Olympus and Maverick use. These populations were cross-resistant to all of the cheatgrass herbicides used in wheat. Since that time, other fields with ALS-resistant cheatgrass have also been confirmed.

The only herbicide previously mentioned that can provide control of jointed goatgrass or feral rye is Beyond, but producers would need to have planted a Clearfield wheat variety in order to use Beyond herbicide. Growers now have the option of planting one- or two-gene Clearfield wheat varieties. Two-gene varieties are usually designated as CL+ or CL2. Two-gene varieties have a higher degree of resistance to Beyond, and thus have an expanded window of application and can be used in combination with methylated seed oil for enhanced weed control. Beyond is only labelled for suppression of rye, but once again, fall applications generally provide the best control.

PowerFlex and Beyond can also provide good control of ryegrass, while Olympus will only provide suppression. Producers need to realize ryegrass is different than cereal rye. Thus, it is important that producers make that distinction when they hear or read advertisements about ryegrass control. Beyond can provide control of both ryegrass and rye, while PowerFlex can give very good ryegrass control, but will not control rye. Olympus can provide suppression of ryegrass, but will not control rye.

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3. Diplodia ear and stalk rot

The 2106 corn production year has proven to be a banner year first for Diplodia ear rot, and more recently Diplodia stalk rot. The disease is caused by the fungus *Stenocarpella maydis*, which survives in old crop debris. Diplodia ear rot is most prevalent in years where there is significant rainfall beginning at silking and then for two to three weeks after silking. Much of the corn in the eastern two-thirds of Kansas was silking in late June through mid-July. Considering all the rain that came around the time of July 4th, it is understandable why the disease is so prevalent.

Back in August, Diplodia would have been easily spotted because the husks on the ear die prematurely (Fig. 1), and the leaf attached to the ear may die prematurely as well.

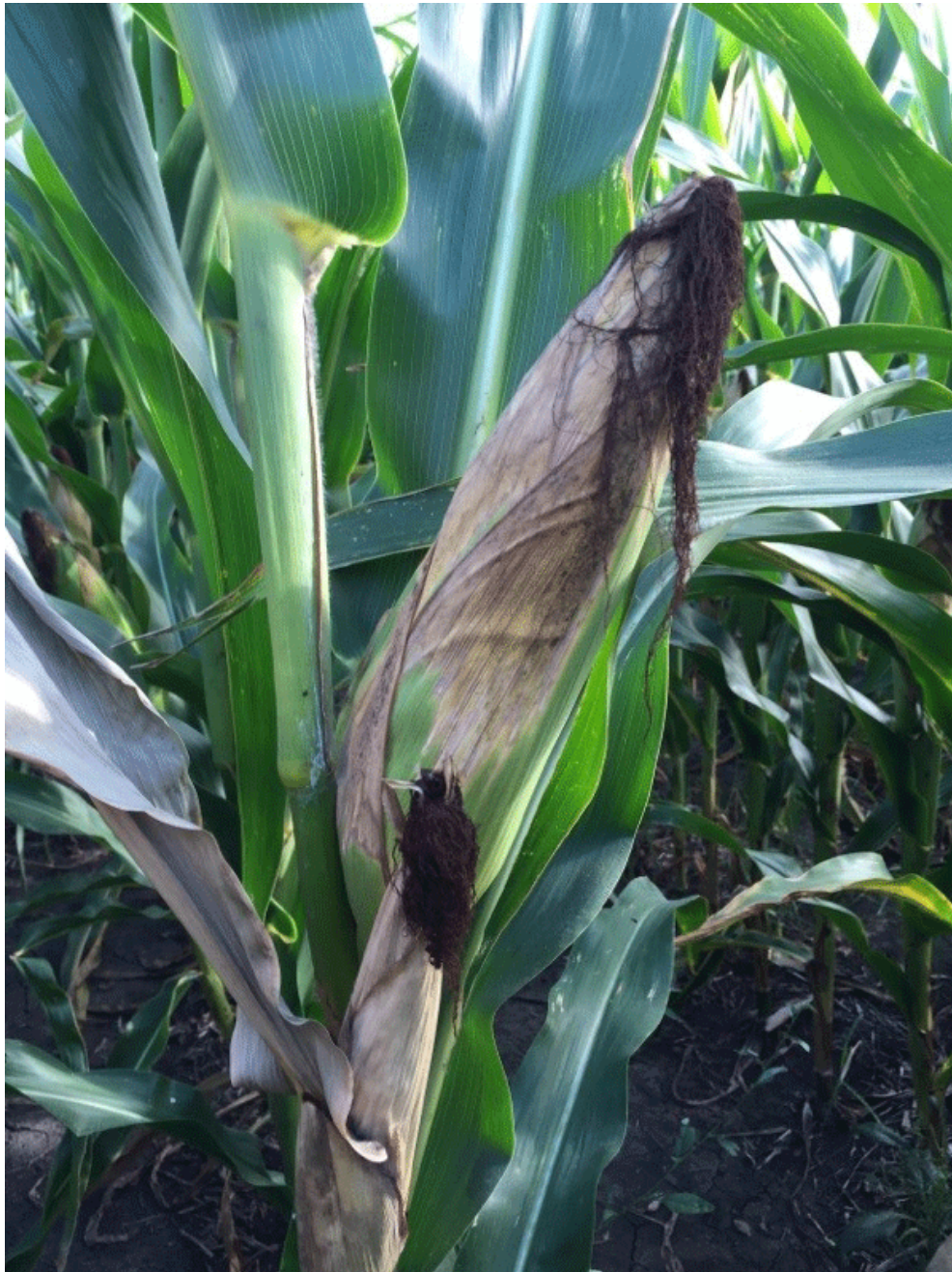


Figure 1. Prematurely dried husks on a Diplodia-infected ear. Photo: Doug Jardine, K-State Research and Extension.

If you were to pull back the husks at that time, you would have seen the kernels covered by a white mold. The disease is usually worse at the butt of the ear and in worse case scenarios, the entire ear may be molded (Fig. 2). The husks often seem to be glued to the ear.



Figure 2. White, moldy growth covering a Diplodia-infected ear. Photo: American Phytopathological Society.

At this time of the season, much of that white moldy growth has disappeared and the ear will have a shrunken, grayish-brown coloration (Fig. 3).



Figure 3. Diplodia ear rot at harvest. Photo: Paul Bachi, University of Kentucky Research and Education Center, www.bugwood.org

The fungus also penetrates and begins to decompose the cob, hence this disease is sometimes referred to as "cob rot." When infected cobs are broken in half, small, black reproductive structures, called pycnidia, are often visible (Fig. 4).

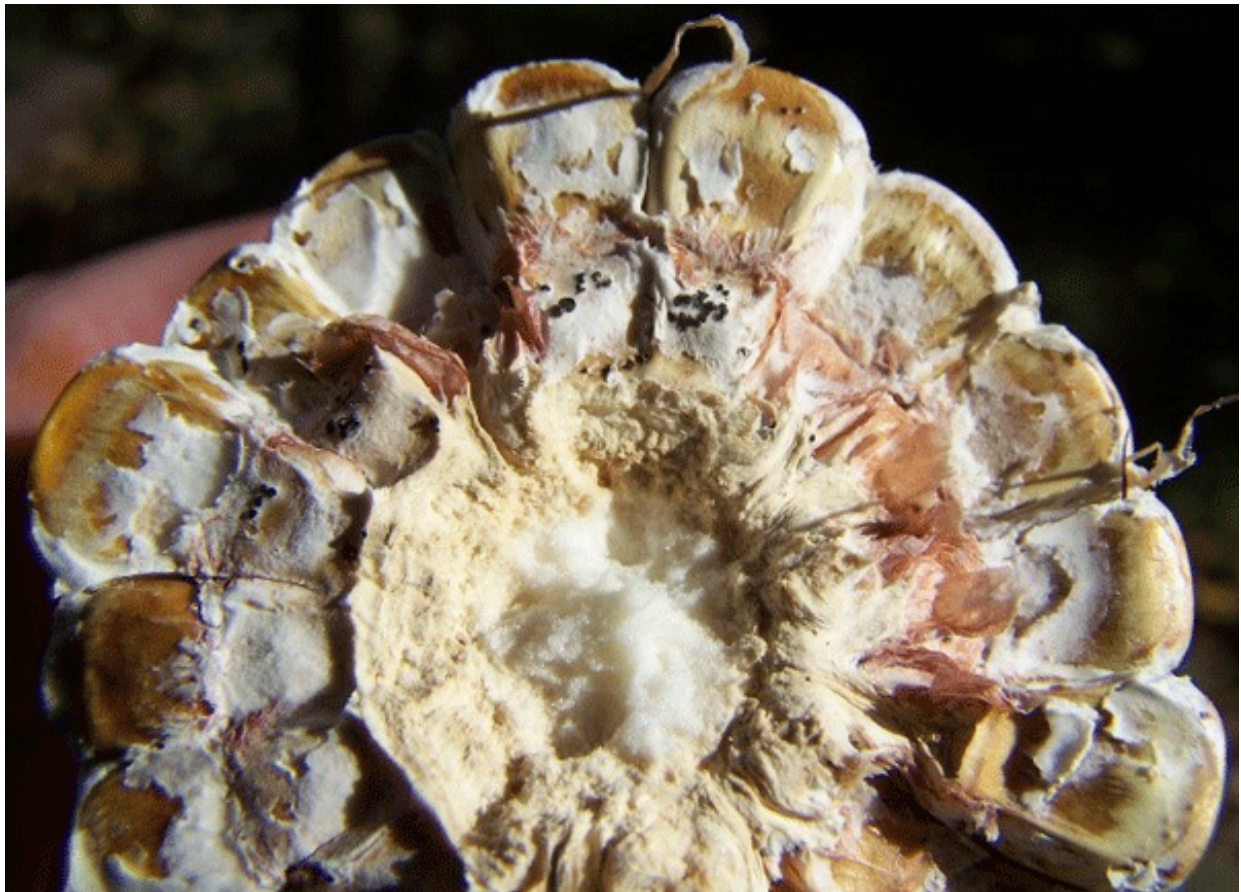


Figure 4. Black pycnidia visible when the ear is broken in half. Photo: Carl Bradley, University of Kentucky.

When the cob is rotted, it disintegrates as it passes through the combine, resulting in high levels of “foreign material” in the load. The foreign material, in addition to the shrunk discolored kernels, typically leads to large dockages at the elevator. Reduction in price from the dockage, when added to the reduction in yield from the shrunk, light-test-weight kernels, can make this a very expensive disease problem for producers.

Hybrids vary in susceptibility to Diplodia ear rot, so choosing a more resistant hybrid is a good place to begin a management plan. Since the disease resides in crop residue, using a crop rotation or some tillage, where it fits into the production system, can also be useful. Some fungicides have a label for “suppression” of Diplodia ear rot, but in university trials there have been very inconsistent results in this approach to management and we do not recommend fungicide applications solely for Diplodia management.

Also associated with Diplodia ear rot is Diplodia stalk rot. Diplodia stalk rot can enter the lower stalk from the soil or the upper stalk from the diseased ear. Diplodia stalk rot looks very much like other stalk rots. There is a shredding of the lower internodes and a general tan discoloration to the tissue.

What sets the identification of Diplodia apart from other stalk rots is the development of the pycnidia on the lower internodes (Fig. 5) brace roots, or on the collars of leaves when the disease moves into

the stalk from the ear.



Figure 5. Pycnidia of *Diplodia* stalk rot forming on the lower stalk. Photo: Doug Jardine, K-State Research and Extension.

Like the other stalk rots, fields with high levels of *Diplodia* stalk rot should be targeted for early harvest to avoid the threat of lodging.

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4. Expected number of days to harvest summer crops in Kansas

Weather and workday probabilities vary over time and across Kansas. Knowledge of workday probabilities and the number of expected workable days to conduct fieldwork impacts crop choice and machinery investment decisions.

Using the “most active” dates to harvest Kansas crops as estimated from USDA-NASS weekly Crop Progress and Condition Reports (Tables 1 - 4), the number of days suitable during the most active harvest dates from 1980 to 2015 were graphed for corn, soybean, and grain sorghum for each Kansas crop reporting district (see Figure 1 for districts). The “most active” dates are defined as between the 20th and 80th percentile for the 5-year average from 2011 to 2015. When two or more harvesting periods overlap, crop acreage competes for field equipment (see Figure 2). It should be noted that these dates are not necessarily the best timing for highest yields, but when farmers have been observed to actively conduct these field operations.

In addition, the most active harvest dates for the three summer crops overlap. They do not start at the same time, but all end in mid-November (Fig. 2). The number of days suitable for harvesting summer row crops based on historical observations for all crop reporting districts are presented in this article. Each crop has a separate section and set of histograms for number of days suitable for harvest.

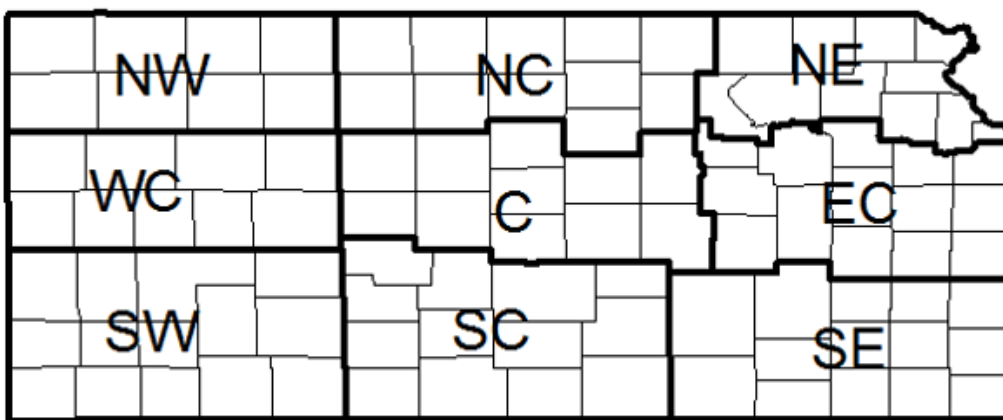


Figure 1. Map of the nine USDA Kansas crop reporting districts.

Table 1. Most active crop planting and harvest dates in Kansas, average of 2011-2015 growing seasons.

	Planting		Harvest	
	Start	End	Start	End
Corn	April 19	May 17	Sept. 13	Oct. 18
Soybeans	May 10	June 14	Oct. 4	Nov. 1
Sorghum	May 24	June 21	Oct. 11	Nov. 8

Most active progress is defined as between the 20th to 80th percentile.

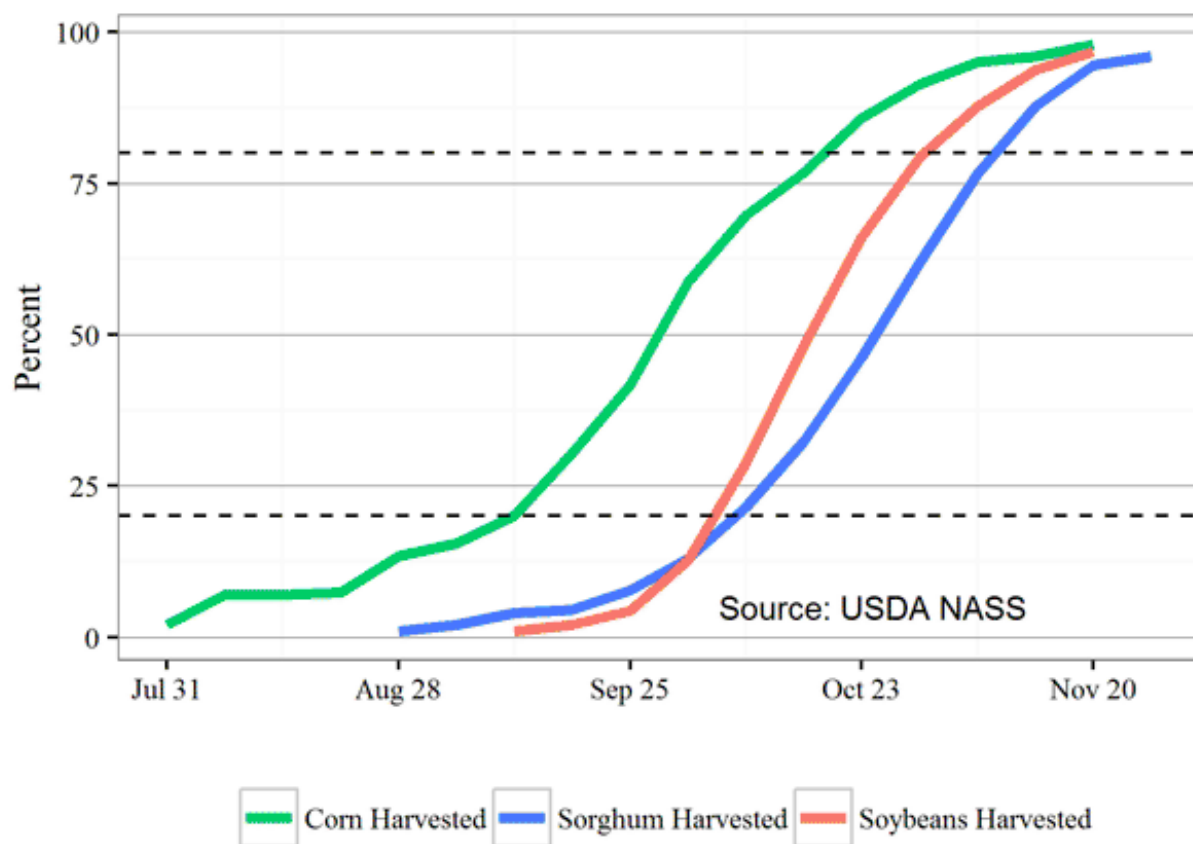


Figure 2. Harvest progress for summer crops in Kansas, 5-year average 2011 to 2015.

Corn harvest

The corn harvesting season in Kansas extends over three months, beginning at the end of July and extending to mid-November (Fig. 3). Statewide, the period of most active corn harvest dates is September 13 through October 18 (Table 1, see Fig. 3 for graphical representation of the 20th and 80th percentile corresponding to September 13 and October 18). However, each crop reporting district has different typical harvest dates (Table 2). Using the most active harvest dates by crop reporting district, the distribution of the number of days suitable during that time period are graphed in histograms in Figure 4. Most active corn harvest starts as early as August 9 in southeast Kansas and as late as September 27 in northwest Kansas. The Southeast District appears to have fewer days suitable for corn harvest than the other districts but it should be noted that corn harvesting had already begun before crop progress data were reported each year. The most active corn harvesting dates end as early as August 23 in southeast Kansas and as late as October 25 in northeast, northwest, west central, and north central Kansas.

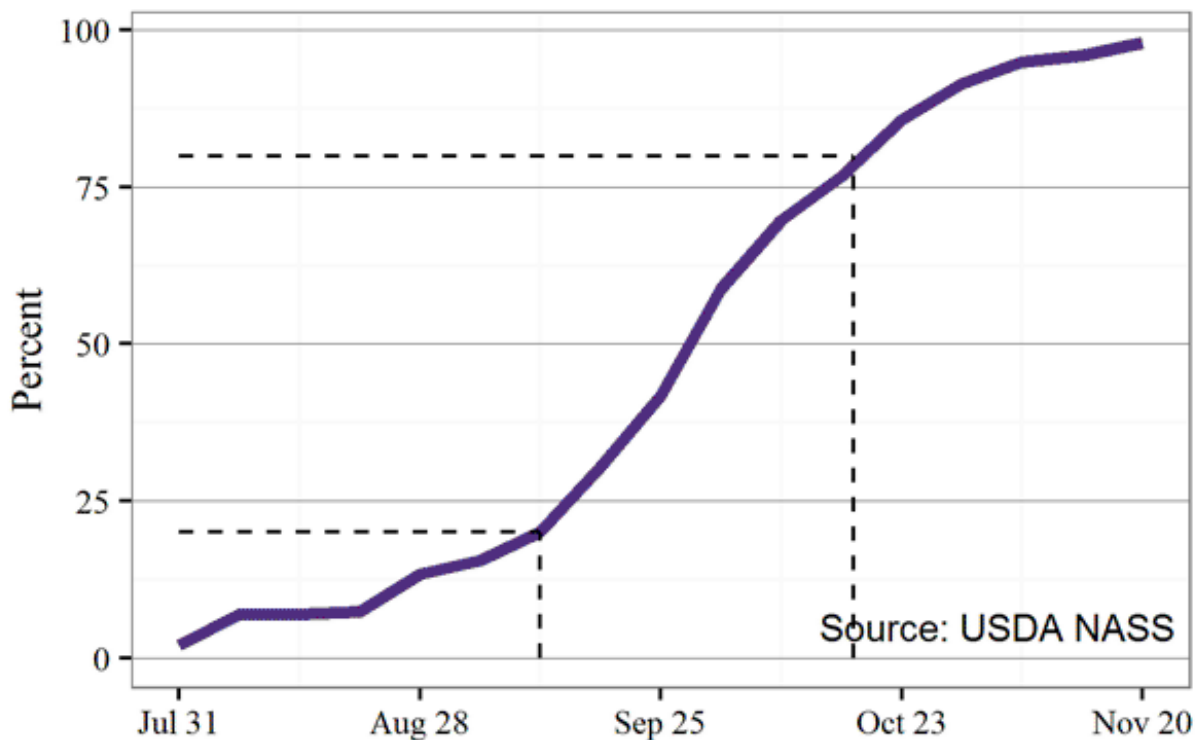


Figure 3. Corn harvesting progress in Kansas, 5-year average 2011-2015

Table 2. Most active corn planting and harvest dates by Kansas crop reporting districts, average of 2011-2015 growing seasons.

	Planting		Harvest	
	Start	End	Start	End
Northwest	May 3	May 24	Sept. 27	Oct. 25
West Central	May 3	May 24	Sept. 20	Oct. 25
Southwest	April 26	May 17	Sept. 20	Oct. 18
North Central	April 26	May 17	Sept. 20	Oct. 25
Central	April 12	May 10	Aug. 30	Oct. 4
South Central	April 19	May 10	Aug. 16	Oct. 4
Northeast	April 19	May 10	Sept. 6	Oct. 25
East Central	April 12	May 10	Aug. 30	Oct. 4
Southeast	April 5	May 10	Aug. 9	Aug. 23

Most active progress is defined as between the 20th to 80th percentile.

Each crop reporting district had a different number of days suitable for harvesting corn during the period of most active harvest dates (Fig. 4). All the crop reporting districts have had at least 10 days suitable for corn harvest each year during the last 35 years, except for the southeast. The Southeast

District has a more peaked distribution, with higher frequency from 18 to 22 days suitable. On the opposite side but with a similar distribution is the South Central District, with high frequency of days suitable to harvest of around 50 days.

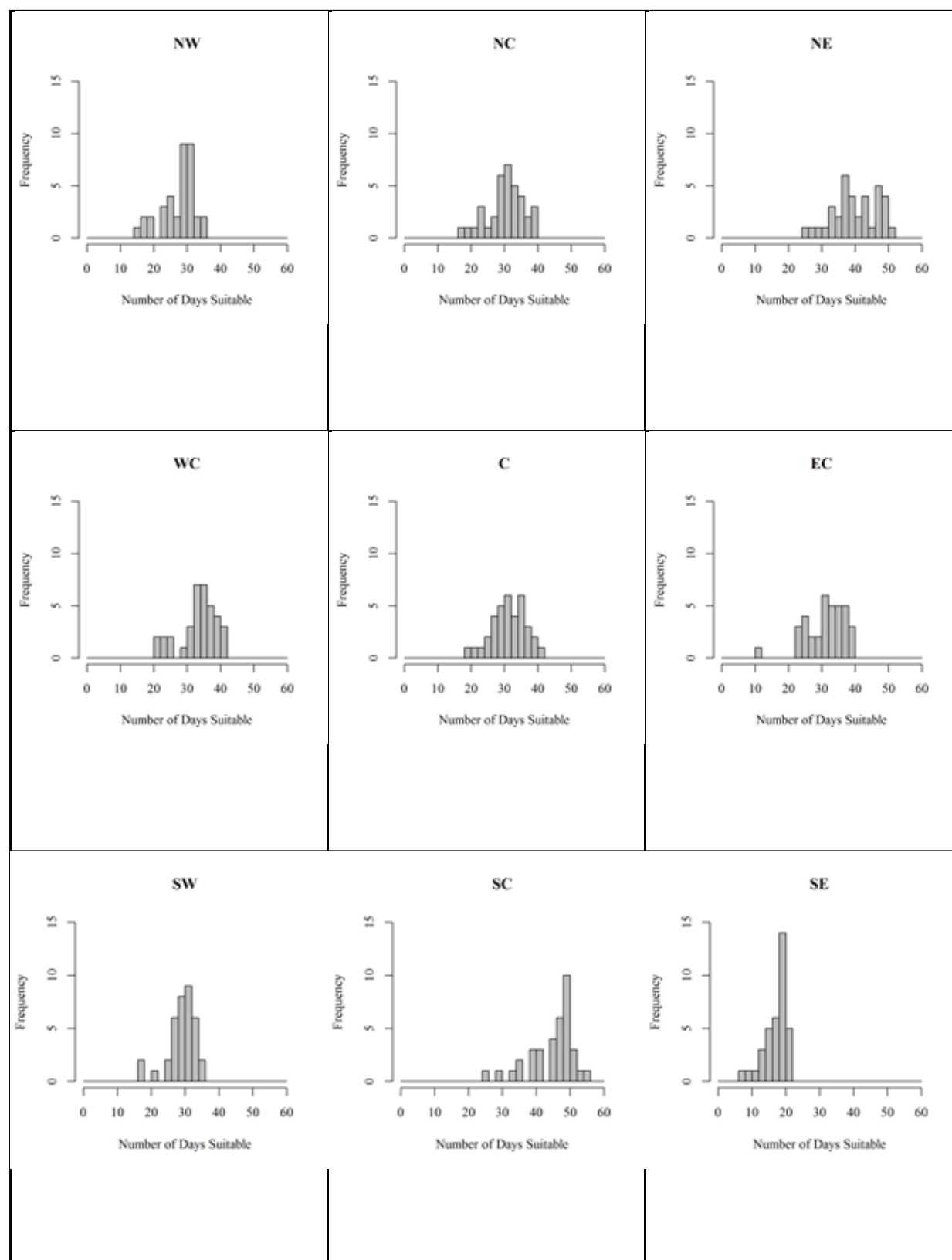


Figure 4. Distribution of the number of suitable days for harvesting corn in Kansas. Source: USDA-NASS 1980-2015.

Soybean harvest

In Kansas, soybean harvest starts approximately six weeks after the beginning of corn harvest. The most active soybean harvest dates are between October 4 and November 1 (Table 1; Fig. 5 for graphical representation of the 20th and 80th percentile corresponding to most active harvest dates), however each crop reporting district has specific dates (Table 3). The most active harvest dates for soybean start as early as October 4 for most of Kansas and as late as October 18 in southeast Kansas, related to late planting time for this area of the state. The most active soybean harvest dates end as early as October 18 to November 15.

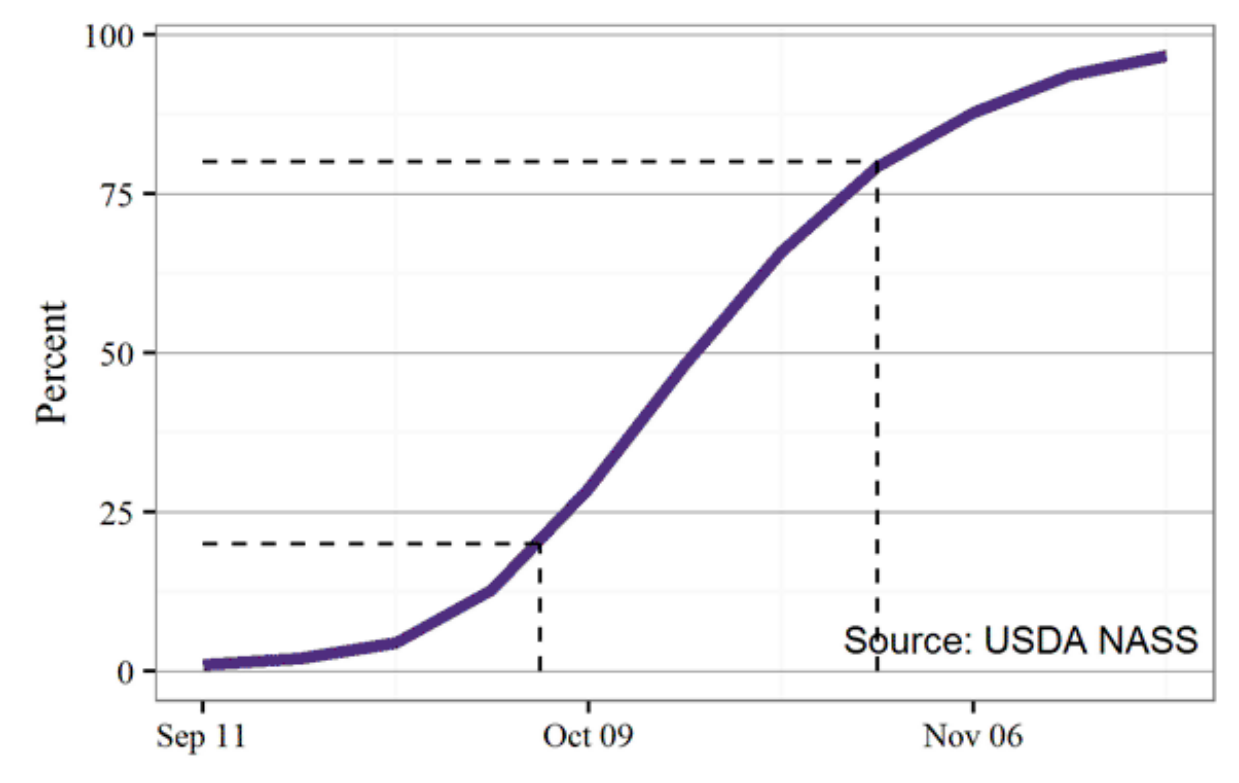


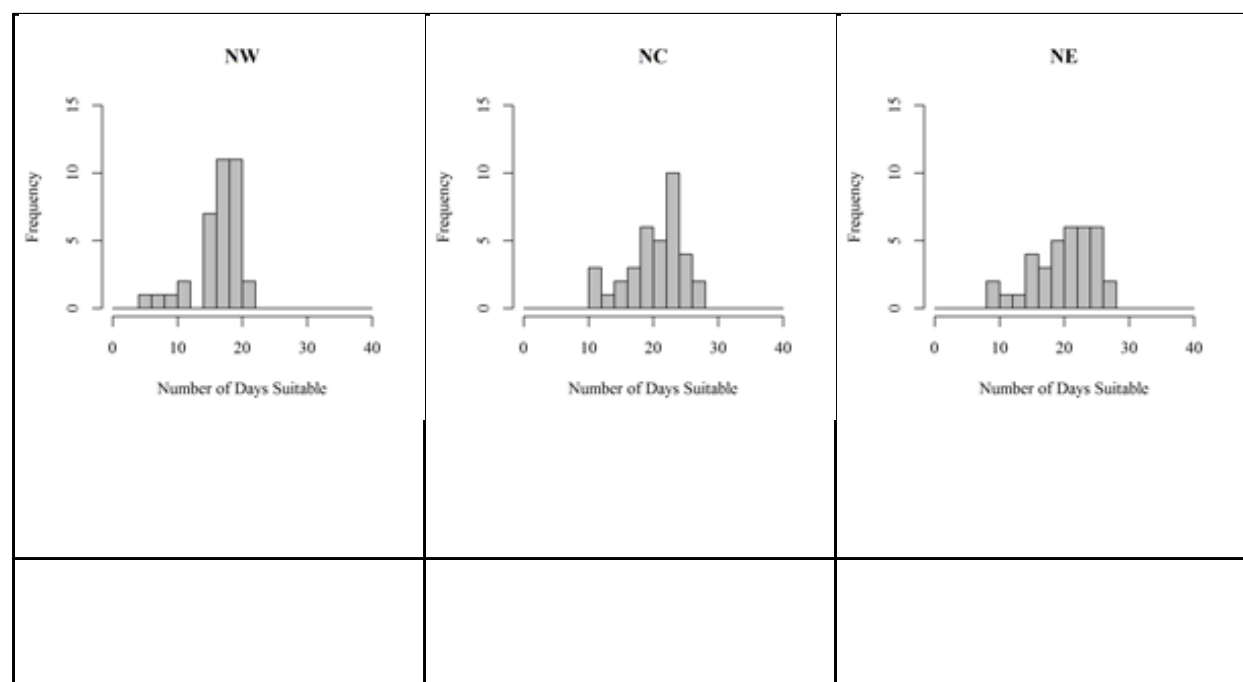
Figure 5. Soybean harvesting progress in Kansas, 5-year average 2011-2015

average of 2011-2015 growing seasons.

	Planting		Harvest	
	Start	End	Start	End
Northwest	May 17	June 7	Oct. 4	Oct. 18
West Central	May 24	June 14	Oct. 4	Nov. 1
Southwest	May 17	June 14	Oct. 4	Nov. 1
North Central	May 10	June 7	Oct. 4	Oct. 25
Central	May 10	June 7	Oct. 4	Oct. 25
South Central	May 10	June 14	Oct. 4	Nov. 1
Northeast	May 10	June 7	Oct. 4	Oct. 25
East Central	May 17	June 14	Oct. 11	Nov. 8
Southeast	May 17	June 28	Oct. 18	Nov. 15

Most active progress is defined as between the 20th to 80th percentile.

The Southeast District has the most variability in the number of suitable days, with values from 6 to 32 days in a 5-week period. The Central, North Central, Northeast, and Central Districts have approximately bell-shaped distribution, concentrated between 10 and 25 suitable days, indicating possible stable weather conditions from year to year during the harvesting season. The Northwest District peaks around 15-20 suitable days, with a low frequency related to values lower than 10 days (Fig. 6).



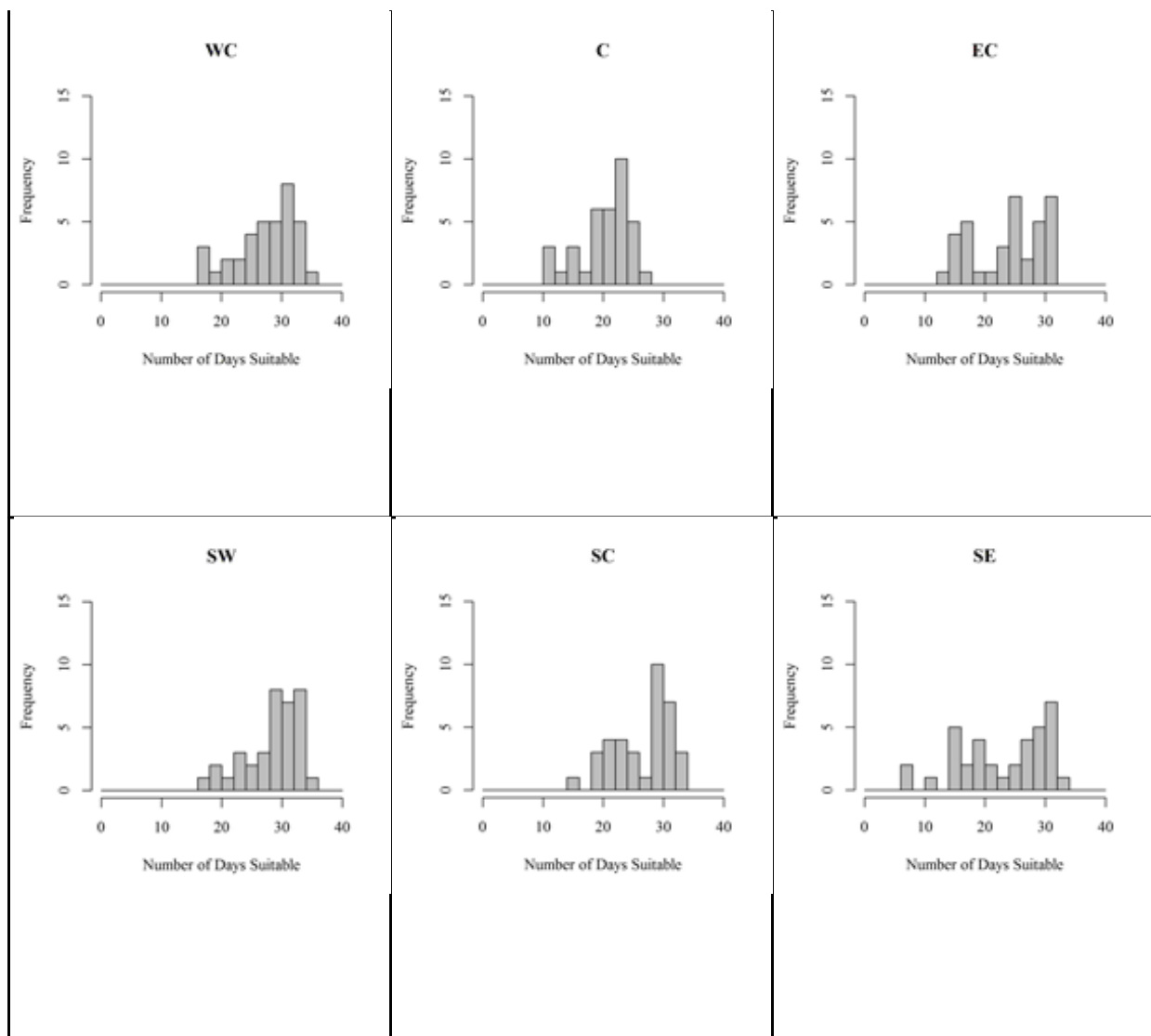


Figure 6. Distribution of the number of suitable days for harvesting soybeans in Kansas.
Source: USDA-NASS 1980-2015.

Grain sorghum harvest

The grain sorghum harvest dates in Kansas are more similar to soybean than corn harvest dates (Fig. 7). The period of most active harvest dates for grain sorghum is between October 11 and November 8 (Table 1 and Fig. 7 for graphical representation of the 20th and 80th percentile corresponding), however each crop reporting district may differ (Table 4). The most active grain sorghum harvesting dates began as early as September 20 (southeast Kansas) and as late as October 18 in the North Central and Northeast Districts. The most active harvest dates in Kansas end as early as November 1 and as late as November 15 for grain sorghum.

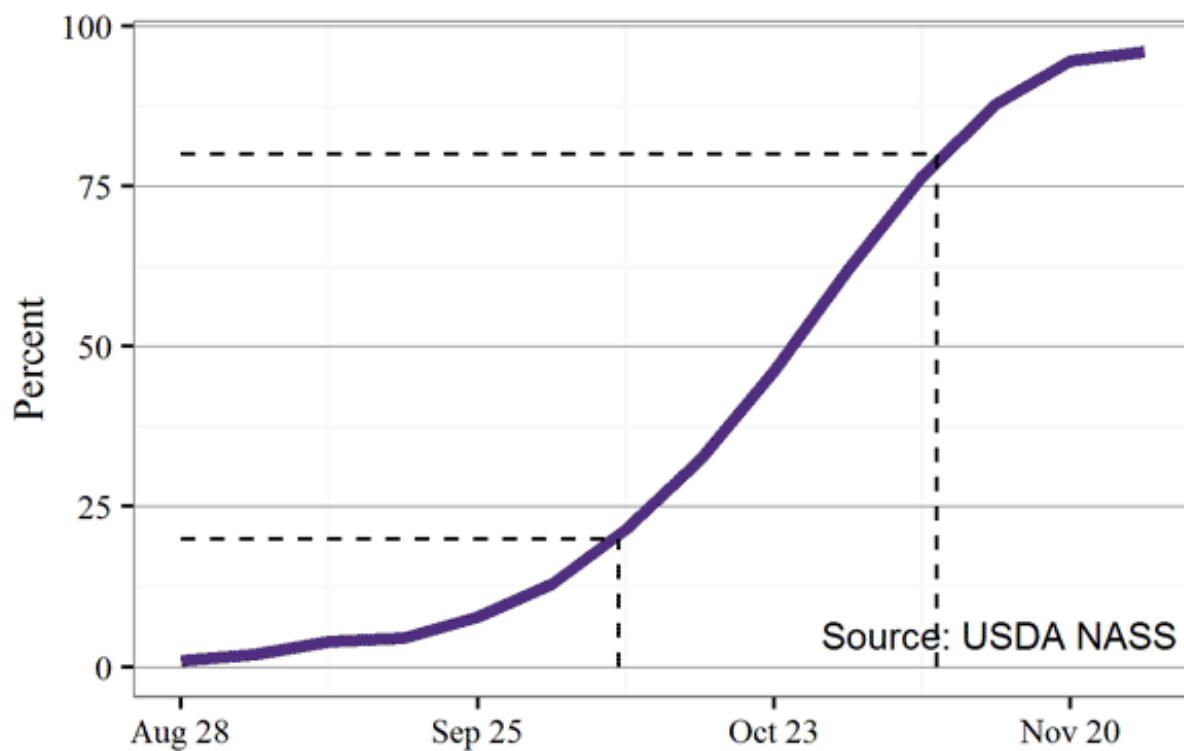


Figure 7. Sorghum harvesting progress in Kansas, 5-year average 2011-2015

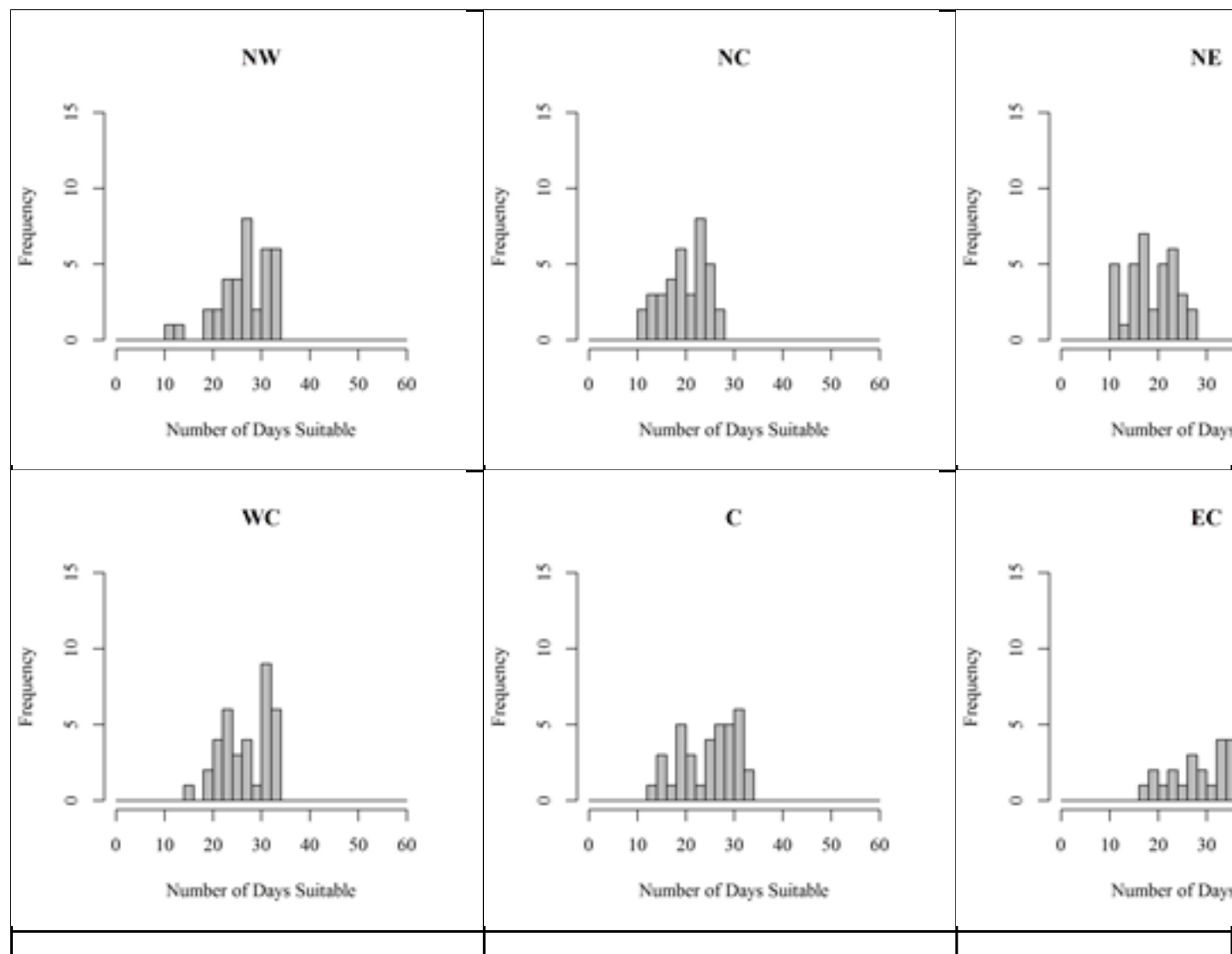
Table 4. Most active grain sorghum planting and harvest dates by Kansas crop reporting districts, average of 2011-2015 growing seasons.

	Planting		Harvest	
	Start	End	Start	End
Northwest	May 24	June 14	Oct. 11	Nov. 8
West Central	May 31	June 21	Oct. 11	Nov. 8
Southwest	May 31	June 21	Oct. 11	Nov. 15
North Central	May 31	June 21	Oct. 18	Nov. 8
Central	May 24	June 21	Oct. 11	Nov. 8
South Central	May 17	June 21	Sept. 27	Nov. 8

Northeast	May 24	June 21	Oct. 18	Nov. 8
East Central	May 24	June 21	Oct. 4	Nov. 15
Southeast	May 10	June 14	Sept. 20	Nov. 1

Most active progress is defined as between the 20th to 80th percentile.

All the crop reporting districts had at least 10 suitable days for harvesting grain sorghum during the most active days (Fig. 8). For the East Central and Southeast Districts the number of suitable days ranges widely from 10 to 45. A more concentrated distribution of suitable days (10 to 30) for harvesting was observed in the Northwest, West Central, and North Central Districts.



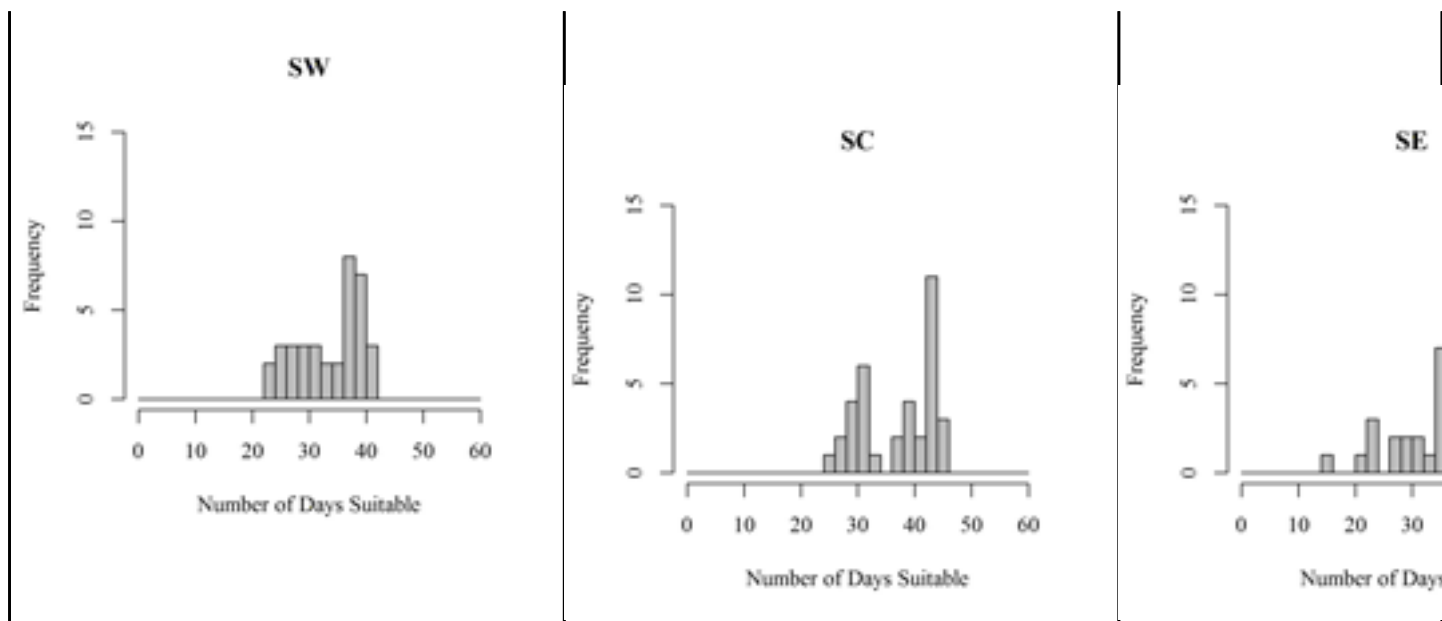


Figure 8. Distribution of the number of suitable days for harvesting sorghum in Kansas.
Source: USDA-NASS 1980-2015.

Summary

Using historical observed harvest data provides an indication of the expected number of days suitable for harvest. These data empower farmers in making equipment-sizing decisions for a given combination of crops being produced across the farm. We are grateful to USDA-NASS Northern Plains Region Field Office for providing days suitable for fieldwork data for all Crop Reporting Districts.

Weekly USDA-NASS Crop Progress and Condition Reports are available at:

https://www.nass.usda.gov/Statistics_by_State/Kansas/Publications/Crop_Progress_and_Condition/

Interactive graphs for Kansas days suitable for fieldwork available at;

<https://www.agmanager.info/machinery/kansas-days-suitable-fieldwork>

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5. October tornadoes in Kansas

Tornado season in Kansas is generally considered to be predominately a spring event. However, October 2016 has brought a sharp increase in tornadic activity.



Figure 1. Tornado in Clay County on October 12, 2016. Photo by Chip Redmond, K-State Research and Extension.

The preliminary totals, through October 12th, are 19 tornadoes. Figure 2 shows how this October compares to previous years:

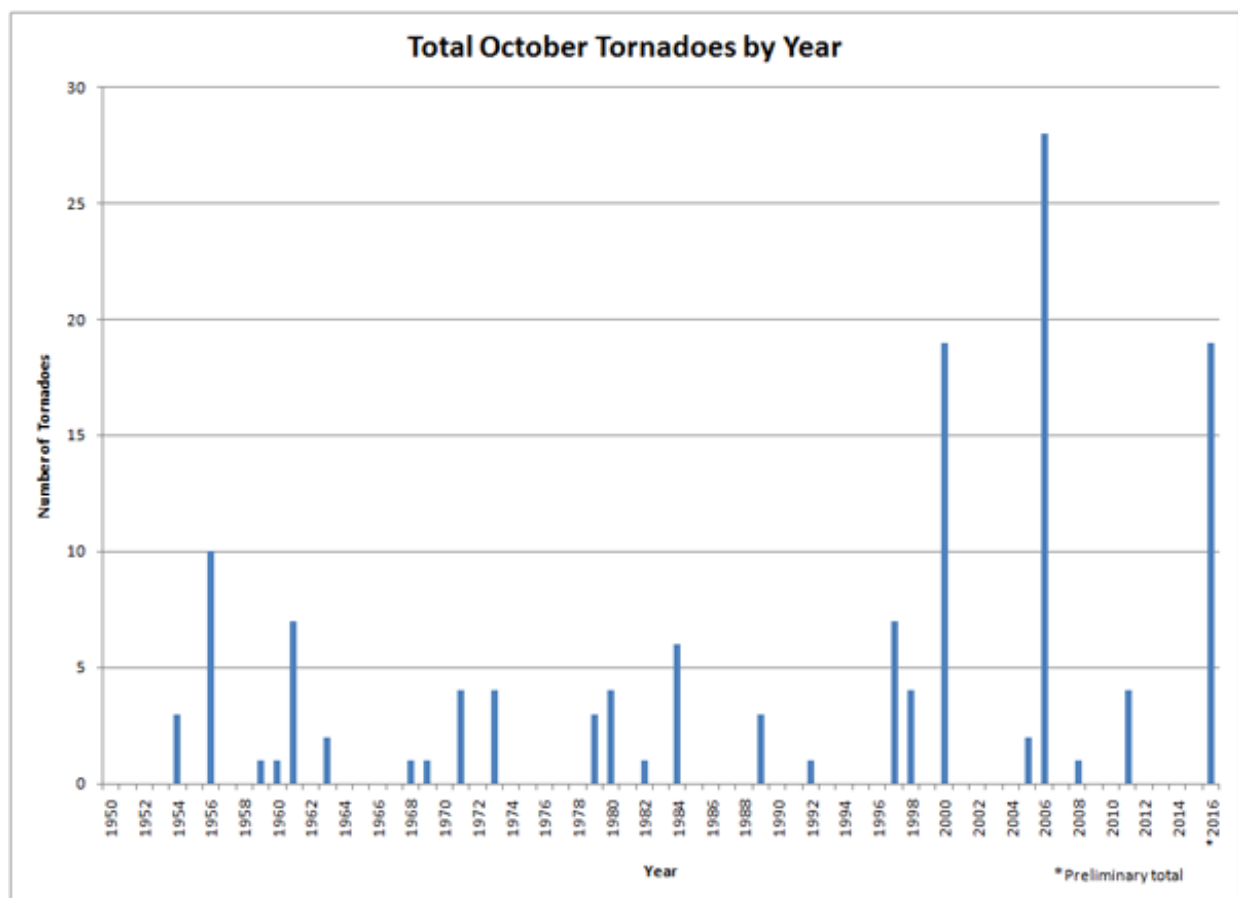


Figure 2. October tornadoes by year.

It is important to note that since the start of the millennium, detection methods have improved. These improved techniques, including Doppler radar and increased numbers of storm chasers, tend to capture more of the weak events, and skew observations towards higher numbers. Of the 19 tornadoes in the current preliminary report for October 2016, the strongest has been classified as an EF3 while most have been rated as EF0 or EF1.

Tornado numbers can vary significantly from year to year. Based on current counts, October 2016 ties as the October with the second most tornadoes since 1950. The final total count for the month could either increase or decrease. Increased numbers are possible if additional severe weather outbreaks occur; decreased numbers are possible if duplicate reports are eliminated from the current total. Below is a chart showing which years had the highest October totals overall:

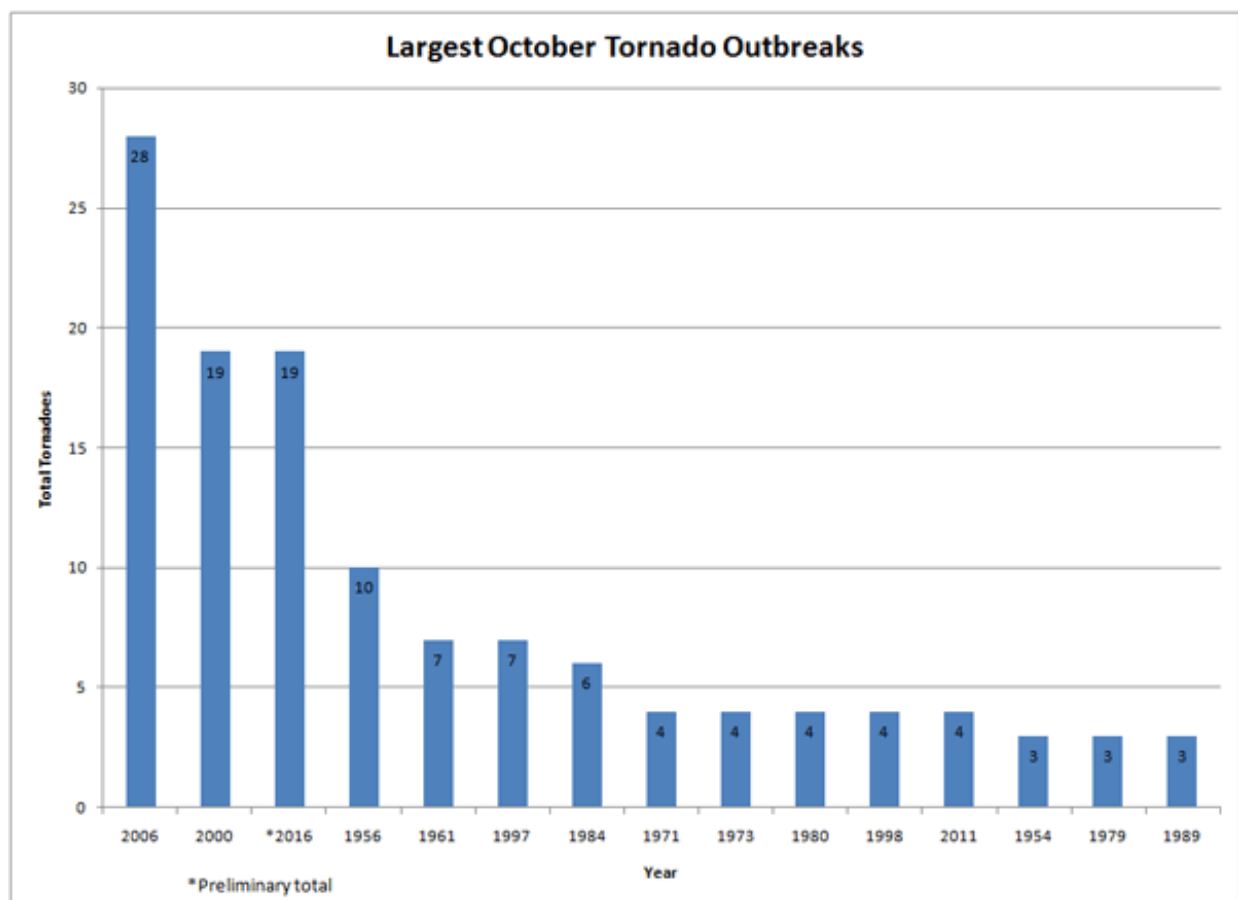


Figure 3: Top October tornado totals.

Even in a very active year, October's contribution to total annual tornado number tends to be small.

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6. Comparative Vegetation Condition Report: October 4 - 10

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 27-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography. His pioneering work in this area is gratefully acknowledged.

The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

Kansas Vegetation Condition

Period 41: 10/04/2016 - 10/10/2016

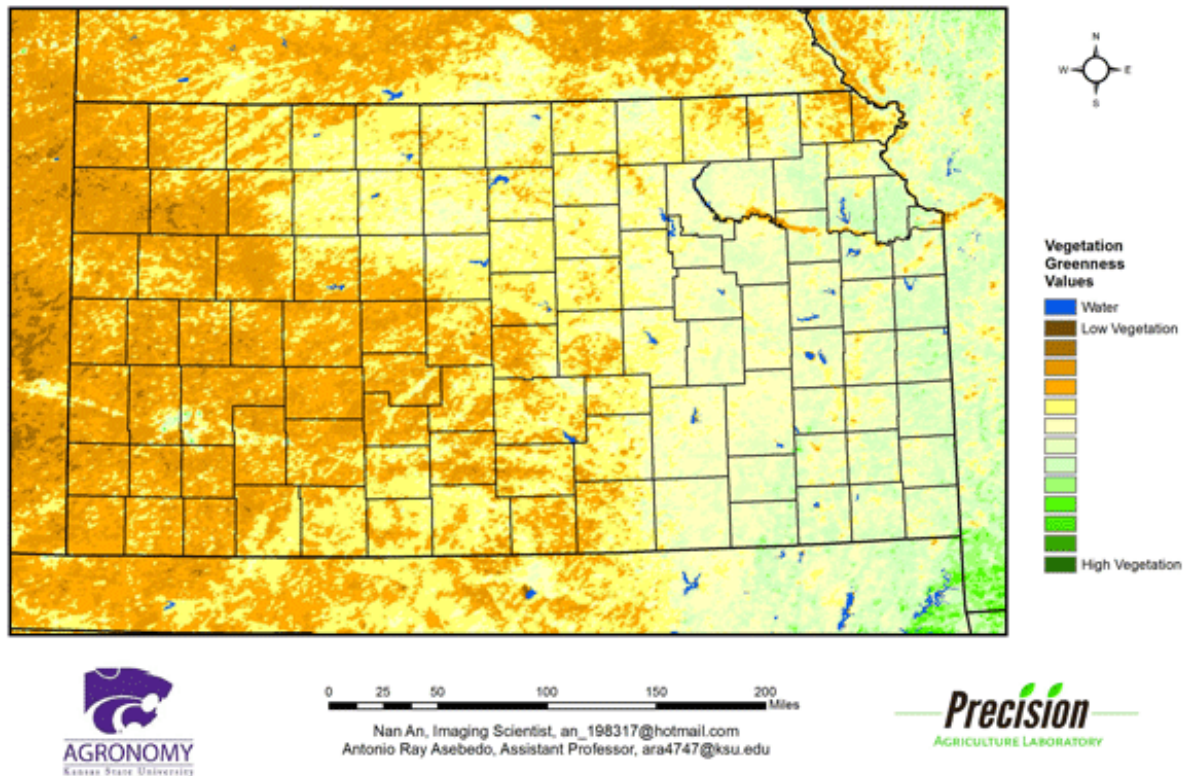


Figure 1. The Vegetation Condition Report for Kansas for October 4 – October 10, 2016 from K-State’s Precision Agriculture Laboratory shows only light photosynthetic activity concentrated in the easternmost counties. Some lower NDVI levels are visible in the river valleys. High streamflow levels have impacted vegetation in those areas. Vegetation continues to move into dormancy in the western areas of the state.

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Kansas Vegetation Condition Comparison

Early-October 2016 compared to the Early-October 2015

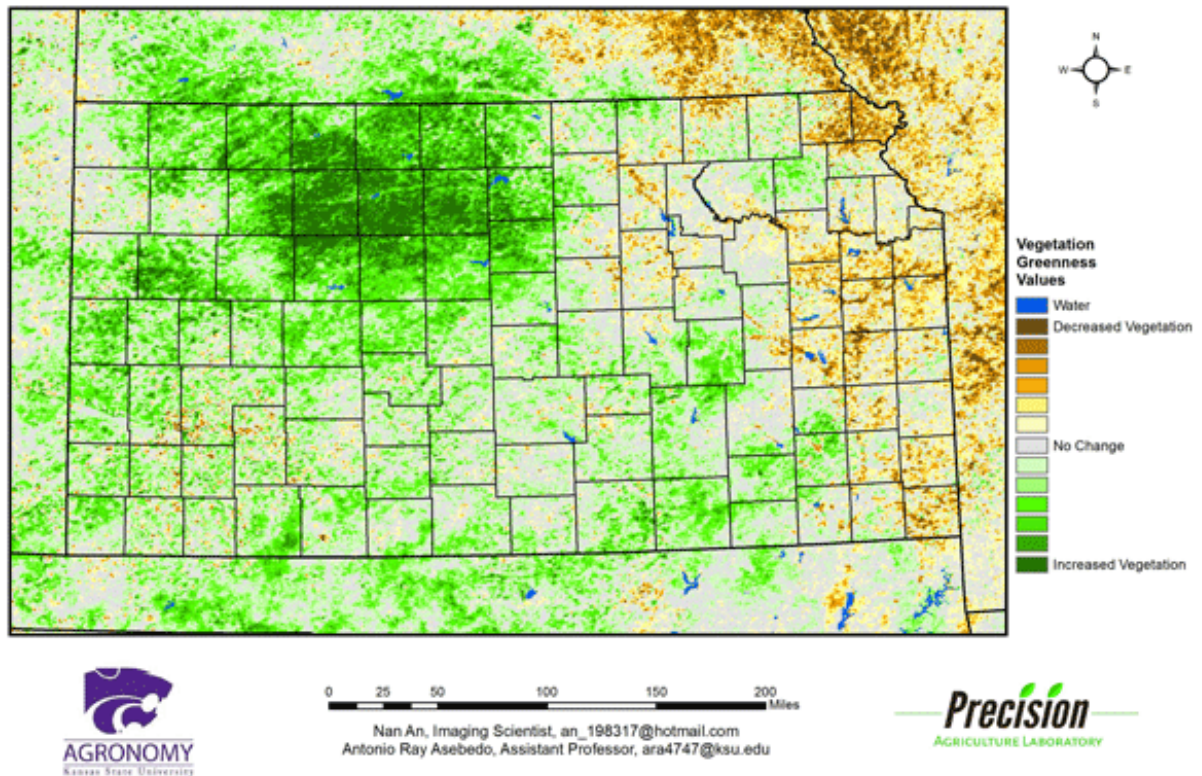


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for October 4 – October 10, 2016 from K-State’s Precision Agriculture Laboratory shows the largest area of increased vegetative production is in north central Kansas. The delay in sorghum development is the major contributor to this higher vegetative activity. At this time last year, sorghum maturity in north central Kansas was at 78 percent. This year the sorghum maturity is rated at 56 percent.

Kansas Vegetation Condition Comparison

Early-October 2016 compared to the 27-Year Average for Early-October

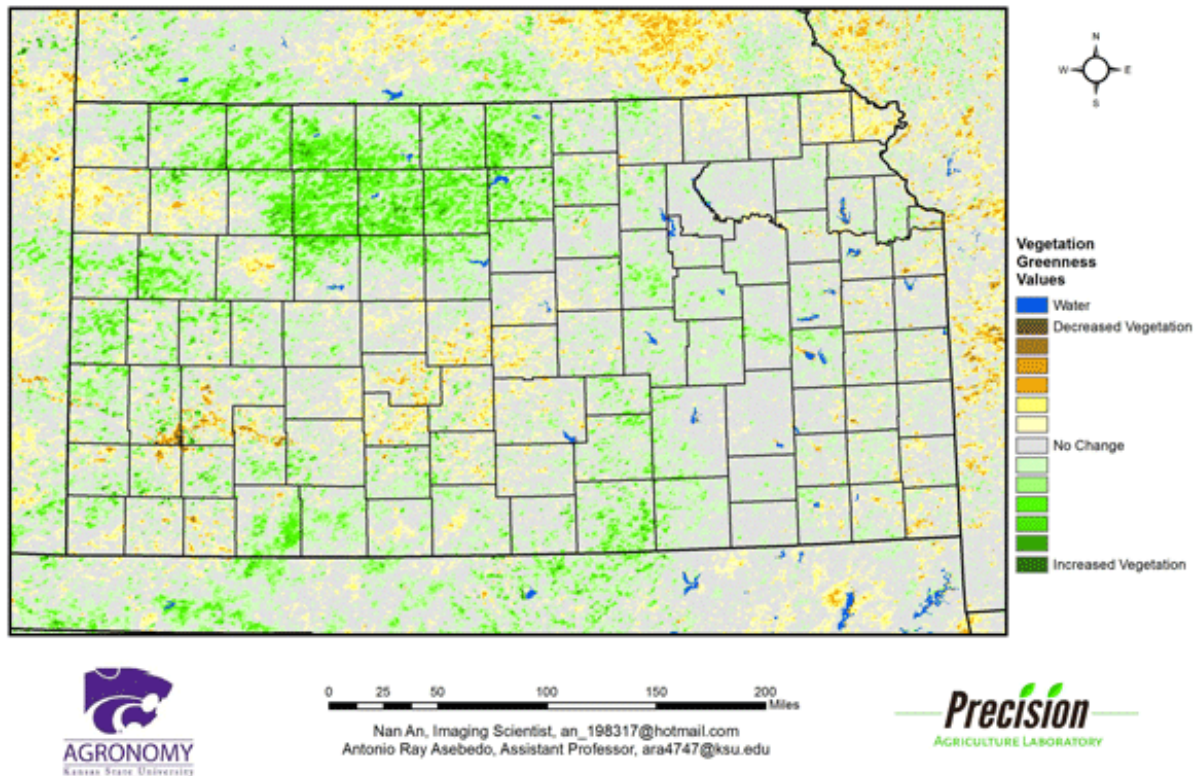


Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for October 4 – October 10, 2016 from K-State's Precision Agriculture Laboratory shows below-average vegetative activity concentrated in the western half of the state, with above-average NDVI values in the north central part of the state. Late planting has delayed sorghum maturity in the area.

Continental U.S. Vegetation Condition

Period 41: 10/04/2016 - 10/10/2016

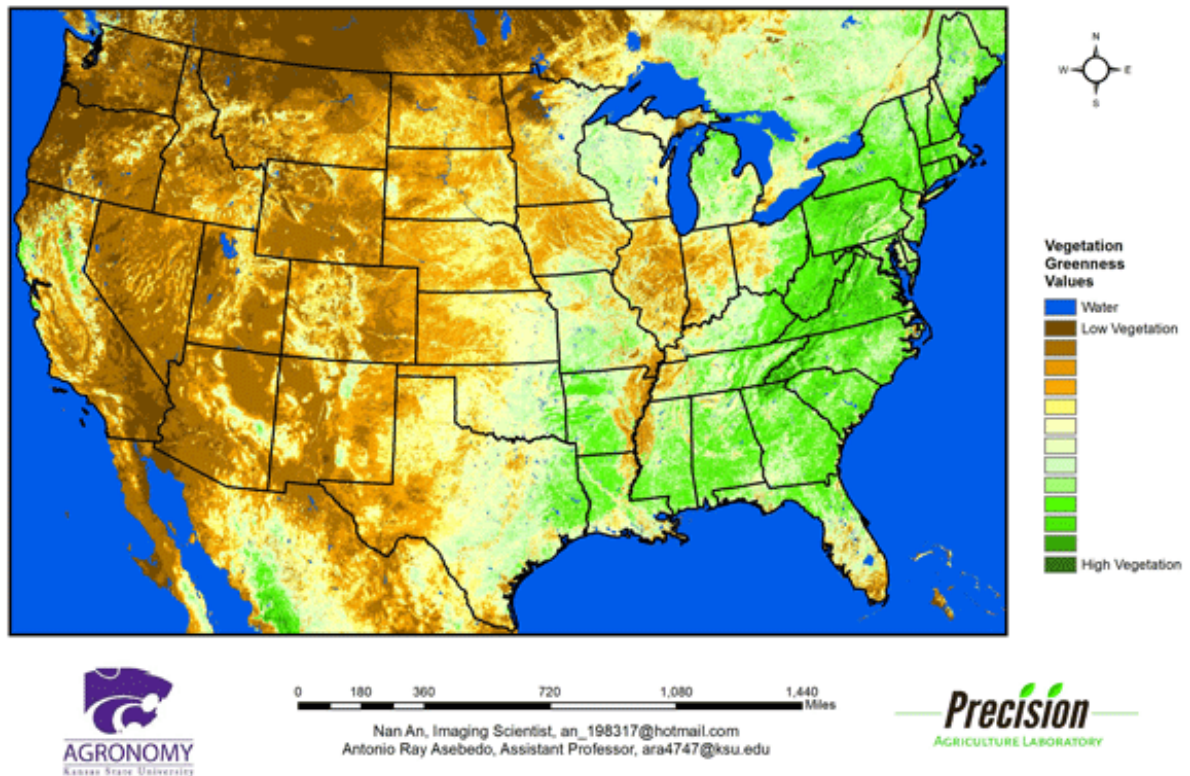


Figure 4. The Vegetation Condition Report for the U.S for October 4 – October 10, 2016 from K-State's Precision Agriculture Laboratory shows the highest NDVI values are in the central Appalachians where mild temperatures have extended the growing season. Low NDVI values are visible in the Corn Belt and along the Mississippi River Valley, where crop maturity is slightly ahead of average, but harvest has been delayed by wet soils.

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Continental U.S. Vegetation Condition Comparison
Early-October 2016 Compared to Early-October 2015

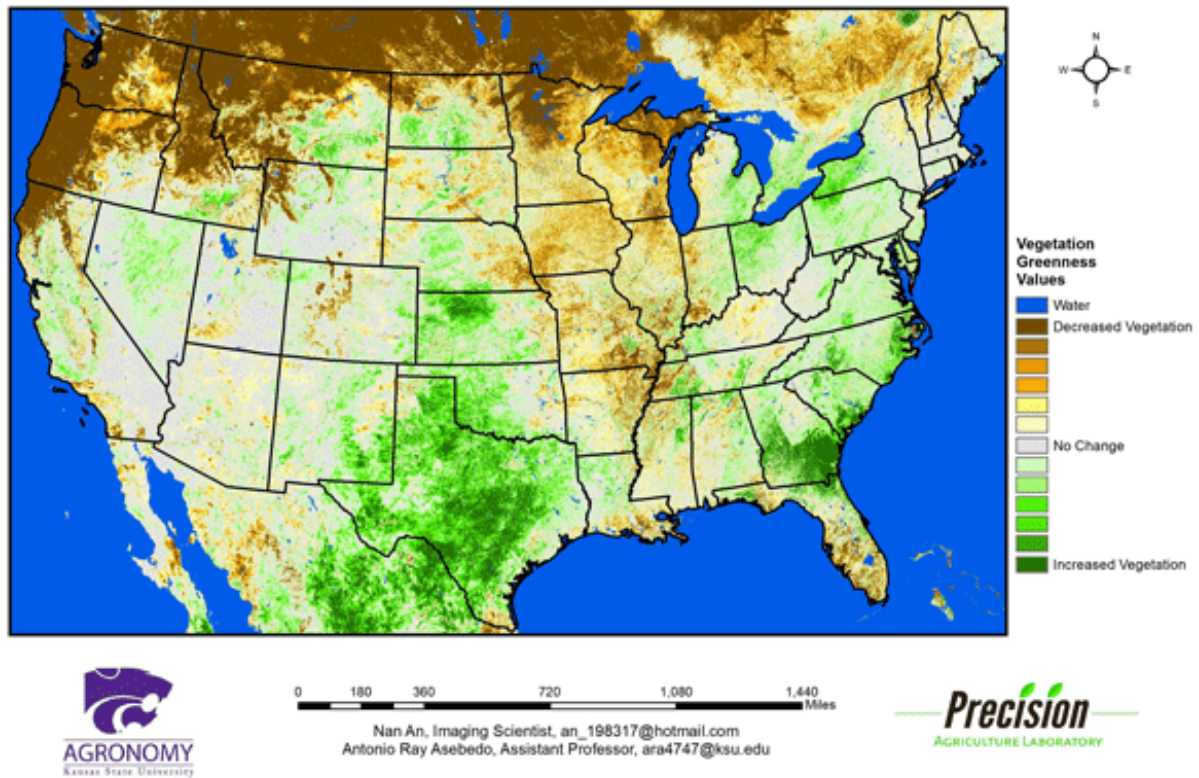


Figure 5. The U.S. comparison to last year at this time for October 4 – October 10, 2016 from K-State’s Precision Agriculture Laboratory shows lower NDVI values in the upper Midwest, particularly in Minnesota and Wisconsin. Persistent rain and cloud cover continues to mask vegetative activity in these areas. In contrast, the Plains and the Southeast have higher NDVI readings. In the Plains, late-maturing crops are the biggest driver of the higher NDVI values.

Continental U.S. Vegetation Condition Comparison
Early-October 2016 Compared to 27-year Average for Early-October

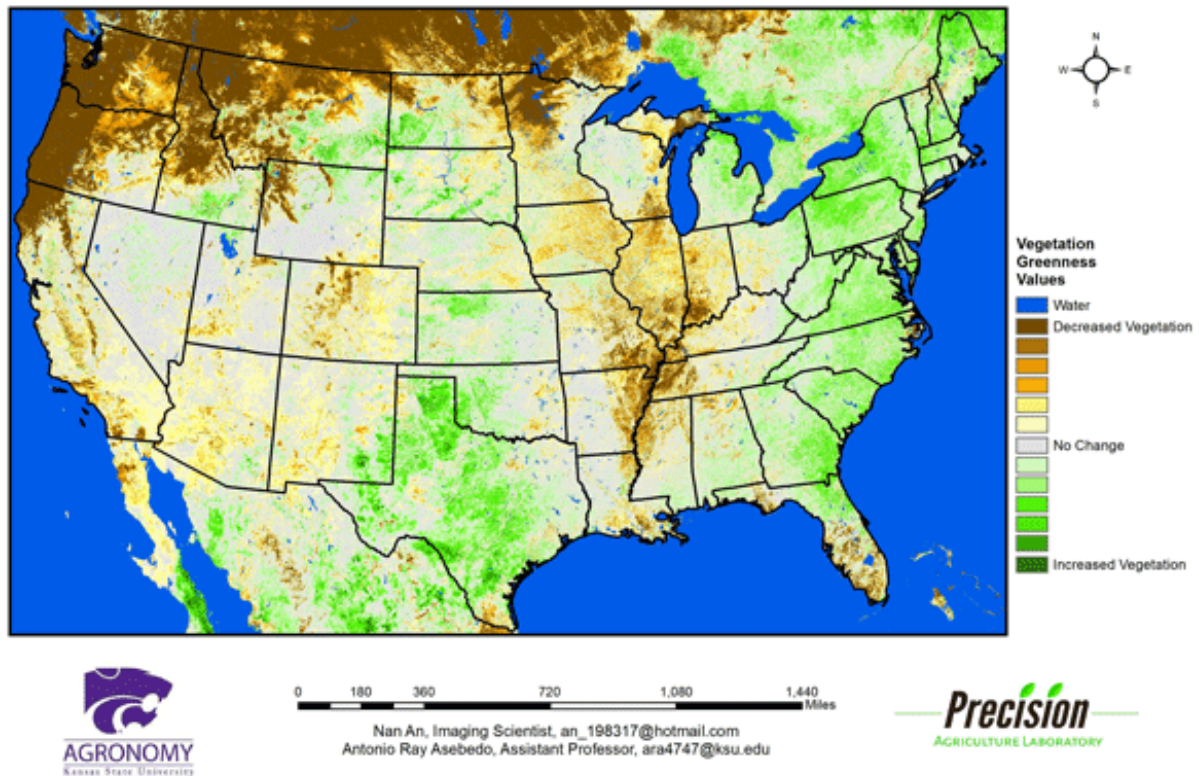


Figure 6. The U.S. comparison to the 27-year average for the period October 4 – October 10, 2016 from K-State’s Precision Agriculture Laboratory shows below-average photosynthetic activity in the Mississippi River Valley and the Pacific Northwest. Heavy rains and saturated soils have limited photosynthetic activity in these regions, particularly as the growing season comes to a close.

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