



Extension Agronomy

eUpdate

07/31/2015

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

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1. Volunteer wheat control: An important step in protecting the wheat crop

The recent wet weather in much of the state has caused volunteer wheat to emerge and grow rapidly. Wet soil conditions may keep producers out of the fields for an extended period, making it even more difficult than usual to control the volunteer.

Volunteer wheat within a half-mile of a field that will be planted to wheat should be completely dead at least two weeks before wheat planting. This will help control wheat curl mites, Hessian fly, and greenbugs in the fall.

The most important threat from volunteer wheat is the wheat streak mosaic virus complex. These virus diseases cause stunting and yellow streaking on the leaves. In most cases, infection can be traced to a nearby field of volunteer wheat, although there are other hosts, such as corn, millet, and many annual grasses, such as yellow foxtail and prairie cupgrass. Control of volunteer is the main defense against the wheat streak mosaic virus complex.

Wheat streak mosaic virus is carried from volunteer to newly planted wheat by the wheat curl mite. These tiny, white, cigar-shaped mites are too small to be seen with the naked eye. The curl mite uses the wind to carry it to new hosts and can travel up to half a mile from volunteer wheat. The wheat curl mite is the vector for both wheat streak mosaic, the High Plains virus, and triticum mosaic virus. In addition, the mite can cause curling of leaf margins and head trapping.

Hessian flies survive over the summer on wheat stubble. When the adults emerge, they can infest any volunteer wheat that may be present, which will keep the Hessian fly population alive and going through the upcoming crop season. We have found that Hessian flies have an adult emergence “flush” after moisture events all summer and even into November, depending upon temperatures. So it seems it is really more of a continuous potential for infestation, making it even more critical to destroy volunteer in a timely manner. If there is no volunteer around when these adults emerge they will not be able to oviposit on a suitable host plant. If the volunteer is destroyed while the flies are still larvae, this will help to reduce potential problems.

Hessian flies often cause significant damage, especially in the eastern two-thirds of the state. Hessian fly larvae attack young wheat plants near the soil line. Tillers may be stunted and later may lodge. In heavy infestations, the whole stand may be lost.

Volunteer wheat is a host of barley yellow dwarf virus, and the greenbugs and bird cherry oat aphids which carry it. So in that respect, destroying volunteer helps reduce the reservoir for the barley yellow dwarf viruses. The aphids have to pick up the BYD virus from an infected host plant first in order to become a carrier that can transmit the disease to wheat. Host plants that can carry the disease include volunteer wheat, corn, and others. However, destroying volunteer will have little effect on aphid populations in the fall and spring since the aphids migrate into the state from southern areas.

Russian wheat aphids may also live over the summer on volunteer wheat. While this insect has wings and can be wind borne for hundreds of miles, the vast majority of fall infestations in Kansas appear to originate from nearby infested volunteer.

A number of other pests are also associated with the presence of volunteer wheat. An example in western Kansas is the Banks grass mite. During some years, infestations become established during

late summer and early fall on volunteer wheat. Later, as the quality of the volunteer deteriorates, mites move from the volunteer into adjacent fields of planted wheat or other small grains. Occasionally mites will survive the winter and continue to spread into the planted wheat following greenup in the spring.

A concern in the eastern part of the state is the chinch bug. Occasionally, adult bugs will fly from maturing sorghum fields in late summer to nearby fields where volunteer wheat is growing. Where infested volunteer is allowed to grow right up until seedbed preparation just prior to planting, early planted continuous wheat is likely to become infested. Similarly, volunteer that is allowed to grow through the fall and into the following spring may also serve as an attractive chinch bug host.

Another reason to control volunteer is that volunteer and other weeds use up large amounts of soil moisture. When water storage is important, such as in summer fallow, volunteer must be destroyed.

Destroying volunteer after the new wheat emerges is too late. Producers should leave enough time to have a second chance if control is incomplete. Tillage and herbicides are the two options available for volunteer control.

Tillage usually works best when plants are small and conditions are relatively dry. Herbicide options depend on cropping systems and rotations. Glyphosate can be used to control emerged volunteer wheat and other weeds during the fallow period in any cropping system. However, it has no residual activity and will not control later germinating volunteer wheat or weeds.

If glyphosate is used too close to planting time, volunteer may stay green long enough to transmit diseases and insects to the new crop. It may take as long as one week following glyphosate application before the wheat will die, so that needs to be considered when timing the application to break the bridge for insects and diseases. The optimum time to treat with glyphosate is when most of the volunteer has emerged and is healthy and actively growing. Glyphosate can effectively control volunteer wheat that has tillered.

Atrazine is a relatively inexpensive treatment for volunteer wheat control that can be applied anytime in the summer or fall, if rotating to sorghum or corn. In the September to October time period, using atrazine plus crop oil alone can often control small volunteer wheat that has not yet tillered, as well as later-emerging volunteer wheat and other weeds.

If the volunteer has tillered, most of the roots will have grown deep enough to be out of the reach of atrazine. This is when it helps to add glyphosate to the atrazine plus crop oil. Glyphosate is translocated from the leaf tissue throughout the plant. The combination of glyphosate and atrazine will provide a good combination of burndown and residual control on both volunteer that has tillered and later-emerging volunteer. Atrazine rates need to be adjusted to soil type and pH, and may not be appropriate for all areas.

In summary, the most important reasons to control volunteer wheat are:

- Wheat curl mite/wheat streak mosaic virus
- Hessian fly
- Russian wheat aphid
- Take-all
- Bird cherry oat aphid/greenbug/barley yellow dwarf virus

- Banks grass mite
- Chinch bug
- Reduces moisture loss

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2. Old World Bluestem control in Kansas grasslands

Old World Bluestem (OWB) is a name collectively used to refer to Caucasian bluestem [*Bothriochloa bladhii* (Retz.) S.T. Blake] and various cultivars of yellow bluestem [*Bothriochloa ischaemum* (L.) Keng] including Turkestan bluestem and King Ranch bluestem.

These species were introduced into the U.S. for conservation purposes and as a forage crop for haying and grazing. In recent years OWBs have been used commonly in the southern Great Plains (Oklahoma and Texas) in grassland plantings and on Conservation Reserve Program (CRP) acres, but are not recommended for use in Kansas. Seedings of Old World Bluestems in Kansas probably started during the 1930s and continued to some extent into the 1960s. Although a number of species are called bluestems, OWBs are not closely related to the native grasses little bluestem and big bluestem.

Old world bluestems are aggressive and prolific seed producers. They are adapted to high calcareous and high pH soils, and do well on any well-drained soil. Today, OWBs can be seen along roadsides and are increasing in our native grasslands. The invasive nature and lower palatability of OWBs allows them to increase once established. Left uncontrolled, OWBs have the potential to dominate our grasslands.

The OWBs are just starting to shoot seedheads in late July. During the growing season OWBs are a light green color and easy to recognize (Fig. 1). In the dormant season OWBs turn to a light straw color (Fig. 2)



Figure 1. Caucasian bluestem (light green grass) spreading up draw in Riley County. Photo by Walt Fick, K-State Research and Extension.



Figure 2. Old World Bluestems turn to a straw color in the fall. Photo by Walt Fick, K-State Research and Extension.

Previous research

Early screenings of various grass control herbicides applied at the 4- to 5-leaf stage of yellow OWB by Keith Harmony at the KSU Agricultural Research Center-Hays indicated that glyphosate and imazapyr provided greater than 90% control of OWB 9 weeks after treatment. One year after treatment, the frequency of OWB in imazapyr-treated plots was less than those treated with glyphosate. In a subsequent study, applications of glyphosate and imazapyr were applied at the 4- to 5-leaf stage and again 8 weeks later to Caucasian bluestem. Glyphosate applied at 1 lb/acre at each application reduced the frequency and tiller density of Caucasian bluestem. Imazapyr at 0.25 lb/acre at each application also reduced the frequency of Caucasian bluestem 1 year after treatment. Both herbicides also controlled remnant native vegetation.

I conducted a study in Ellsworth County to determine the efficacy of glyphosate and imazapyr for Caucasian bluestem control and determine the impact on native vegetation. Treatments were applied at the 4- to 5-leaf stage. Glyphosate at 3 lb/acre and imazapyr at 1 lb/acre both provided greater than 90 percent control of Caucasian bluestem one year after treatment. Native warm-season grasses were nearly eliminated by glyphosate, but were more tolerant of imazapyr.

Recent research

In 2014, I initiated studies to determine the rate effect of imazapyr on Caucasian bluestem control and monitor impacts on native vegetation. Herbicide treatments were applied at two locations in mid-June, 2014 and were evaluated one year after treatment. The Chase County site was burned in 2014 and 2015. Compared to the original cover, OWB declined, warm-season grasses increased in cover, and bare ground increased at imazapyr rates ≥ 0.75 lb/acre (Table 1).

Table 1. Chase County – 2014 Rate Study					
(% cover 1 year after treatment)					
	Rate (lb/acre imazapyr)				
Category	0	0.25	0.5	0.75	1
Old World Bluestem	30	10	8	13	4
Warm-season grass	19	30	41	30	35
Cool-season grass	1	5	4	2	2
Forbs	21	16	18	22	20
Bare ground	14	21	18	30	28
Litter	3	3	2	2	2

The Riley County site was burned in 2014, the year of herbicide application, but was not burned in 2015. A good rate response was measured with imazapyr (Table 2). Warm-season grasses were $\leq 8\%$ of the cover. There was a dramatic increase in forbs, even on the untreated plots. The lack of a prescribed burn in 2015 and a wet spring contributed to an increase in annual broomweed and marehail. Bare ground also increased following application of imazapyr.

Table 2. Riley County – 2014 Rate Study					
(% cover 1 year after treatment)					
	Rate (lb/acre imazapyr)				
Category	0	0.25	0.5	0.75	1
Old World Bluestem	44	27	23	12	1
Warm-season grass	7	8	3	7	2
Cool-season grass	3	5	2	3	6
Forbs	28	37	43	44	43
Bare ground	9	23	39	44	52
Litter	12	3	6	4	8



Figure 3. Imazapyr applied June 13, 2014 at the rate of 0.35 lb/acre. Photo by Walt Fick, K-State Research and Extension.



Figure 4. Imazapyr treatment 3 months after application. Green grass is predominantly native warm-season species. Photo by Walt Fick, K-State Research and Extension.

Summary

Old World Bluestems are an invasive species in Kansas. It can be controlled, but control becomes progressively more difficult and expensive the longer the grass is allowed to grow and spread. Burn or mow OWB prior to herbicide treatment to remove old growth and increase herbicide uptake. Broadcast applications of glyphosate at 3 lb/acre and imazapyr (Arsenal) at 0.25 to 0.5 lb/acre can provide control of OWB. Spot treatment with 1-1.5% glyphosate or 0.25% imazapyr (Arsenal) is recommended.

Remember, one application will not solve the problem. Wiping or wicking glyphosate can be done, especially when OWB is taller than associated species. Tillage and planting of Roundup Ready crops is an option on areas previously cropped and dominated by OWB.

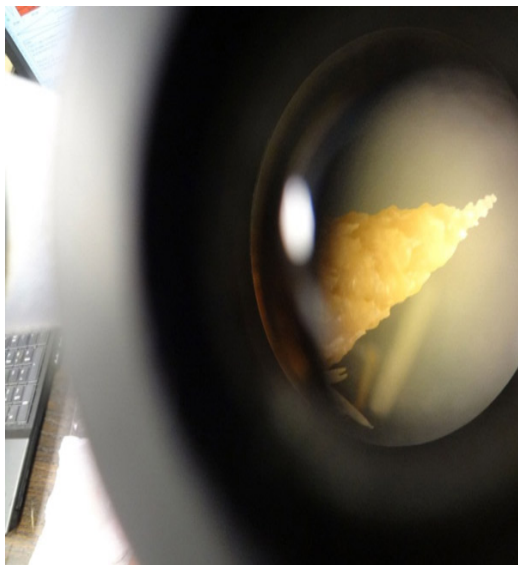
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3. Estimating corn yield potential

The majority of the corn in Kansas is in the reproductive period. From this point towards harvest farmers and consultants can begin to make reasonable estimates for corn yield potential. If no ear was formed within a week or two after pollination, then that specific corn plant will remain “barren” until the end of the season. In that unfortunate situation, you need to choose whether to harvest it for silage or leave it in place for grazing the residue.

The number of potential kernels per ear can be adversely affected either before silking time (Figures 1 and 2), if no potential ovule develops, or after silking. After silking, kernel numbers are reduced under any or all of the following conditions:

- If the fertilization was not effective (unpollinated ovules).
- If there is abortion of the fertilized ovules.
- If there is early abortion of developing kernels (before or at milk stage, R3 stage) (Figure 3).





Figures 1 and 2. Determination of the potential kernel number in corn ears as seen under a microscope (left) and magnifying glass (right). The tip kernels are the first one to start the abortion process under any environmental (abiotic) stress. Photos by Ignacio Ciampitti, K-State Research and Extension.

If ears are present a week or two after silking, producers can get a reasonable yield estimate by the time the corn plants are at the milk or dough stages. Before the milk stage, it is difficult to tell which kernels will develop and which ones will be aborted (Figure 3). The milk stage takes place about 15 to 25 days after flowering, depending on the environmental conditions. We can easily recognize this stage by opening the husk. In the milk stage, a milky white fluid will be evident when the kernels are punctured with a thumbnail (kernel moisture is ~80%).



Figure 3. Grain abortion at the top of the ear (early abortion) and in the mid-section of the ear

(late abortion, brown coloration in right corner picture). Photos by Ignacio Ciampitti, K-State Research and Extension.



Figure 4. Corn at the milk stage (R3 growth stage), a milky white fluid is evident when the kernels are punctured with a thumbnail (kernel moisture is approximately 80%). Photo by Ignacio Ciampitti, K-State Research and Extension.

Farmers can get some estimate of the failure or success of the pollination process by examining several corn ear silks. Pollination is successful when silks turn brown (R2 stage, kernel blister stage) and when they can be easily detached from the ear structure as husks are removed. If the silks remain green and are still attached to the ear after growing several inches in length, pollination has failed (Figure 5). In this situation, the ovules will not be fertilized, and kernels will not develop.

Before estimating corn yields, few points are noteworthy. Yield estimates are more accurate as the corn is approaching maturity. Also, yield estimates can be accurate as long as the sample areas reflect the “real” variation of corn yield within the field. The precision of the method increases as the number of sample areas increases, properly reflecting the variability within the field. Yield estimations before harvest can: (1) facilitate the decision of harvest timing, (2) estimate the need for additional inputs before maturity, and (3) serve as a scouting tool since the method of yield estimation involves examining diverse areas of the field.

CORN – LONG SILKS

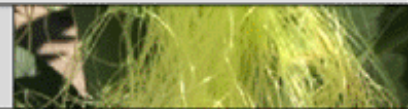
(floral asynchrony)



©K-State Univ, IA Ciampitti



Silks attached to the ear indicates that kernels will not develop (not fertilized).



LONG SILKS ISSUE = silks elongate approx. 1 inch/day until pollen is encountered and the ovule is fertilized. Long silks indicate that pollen was not intercepted – kernels unfertilized

Figure 5. Unpollinated silks have grown in several inches in length. Photos by Ignacio Ciampitti, K-State Research and Extension.

Estimating yields using “yield component method”

The concept of estimating yields using the “yield component method” has advantages and disadvantages. The primary advantage is that it can be used early in the growing season (milk stage, R3). It involves the assumption that the kernel weight is constant. The method only estimates the “potential” yield because the kernel weight component is still unknown until the crop reaches final maturity (R6 stage).

Estimating potential corn yield with this method uses the following elements:

1) Total number of ears (ears per acre): This is determined by counting the number of ears in a

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known area (Figure 6). With 30-inch rows, 17.4 feet of row = one-thousandth of an acre. This is probably the minimum area that should be used. The number of ears in 17.4 feet of row x 1,000 = the number of ears per acre. Counting a longer length of row is fine, just be sure to convert it to the correct portion of an acre. Make ear counts in 10 to 15 representative parts of the field or management zone to get a good average estimate which fairly represents the field variation. The more ear counts you make, if they are representative of the rest of the field, the more confidence you have in your yield estimate.



Figure 6. Total number of corn ears per unit area. Photo by Ignacio Ciampitti, K-State Research and Extension.

2) Final kernel number per ear: Count the number of rows within each ear and the number of kernels in each row (Figure 7). The final number of kernels per ear is calculated by multiplying the number of rows by the number of kernels within each row. This is just a quick estimation of the potential yield.

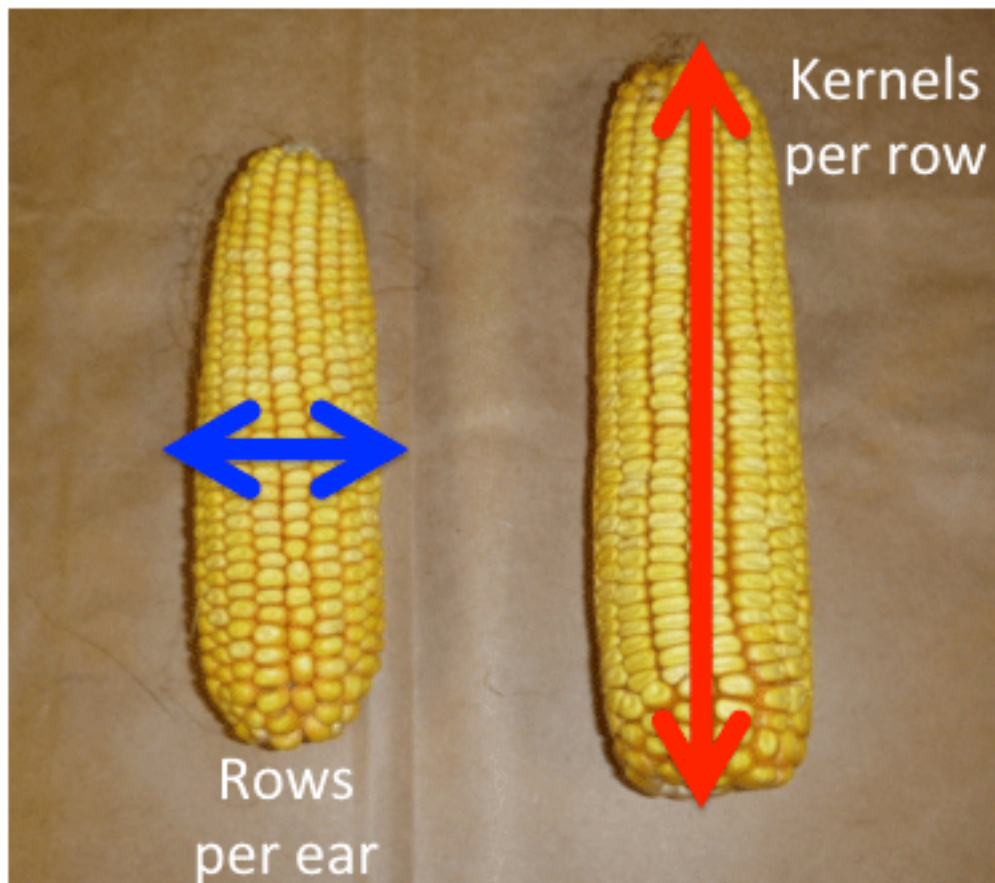


Figure 7. Two different size of ears with similar number of rows (16 rows in total) but different kernel number per row and kernel sizes (left). The photo at right shows the determination of

rows per ear from a vertical position (20 rows in total). The final number of rows per ear is defined earlier in the season than the number of kernels per row, and can be a function of the hybrid and growing conditions. Photos by Ignacio Ciampitti, K-State Research and Extension.

The number of kernels within each row is not standard and can vary from row to row, depending in part on the number of kernels aborted ("abnormal ears"). Do not count aborted kernels or the kernels on the tip of the ear; count only kernels that are in complete rings around the ear. Do this for every 5th or 6th plant in each of your ear count areas. The more you can count, the more precise will be the estimation. Avoid odd, non-representative ears.

Finally the number of kernels per acre is estimated by multiplying the first and second components.

Kernels per acre = Ears per acre x Kernels per ear

Kernels per bushel: This will be more precisely defined at maturity. For this case, common values range from 75,000 to 80,000 for excellent grain filling conditions, 85,000 to 90,000 for average, and 95,000 to 105,000 for poor conditions. The best you can do at this point is estimate a range of potential yields depending on expectations for the rest of the season.

Example:

For corn in 30-inch rows with an average total number of ears in 12 areas of the field (17.4-foot lengths of row) of:

Number of ears = $[(25 + 24 + 22 + 21 + 24 + 26 + 20 + 21 + 22 + 20 + 25 + 26)]/12 = \mathbf{23 \text{ (a)}}$

An average of 23 ears were counted within the 17.4-foot lengths. This can be scaling up to an acre basis by multiplying the number of ears by 1,000 (constant factor if the counts were taken in a 17.4-foot length).

Ears per acre = $23 \times 1000 = \mathbf{23,000 \text{ (b)}}$

From those 23 ears, we will take between 2 and 5 ears to calculate the rows per ear and the kernels per row. The average number of rows was 14 with 27 kernels per row.

Kernel number per ear = $14 \text{ rows per ear} \times 27 \text{ kernels per row} = \mathbf{378 \text{ (c)}}$

The final number of kernels per acre is the outcome of the multiplication of (b) ears per acre and (c) kernel number per ear.

Kernels per acre = $23,000 \text{ ears per acre} \times 378 \text{ kernels per ear} = \mathbf{8,694,000 \text{ (d)}}$

Kernels per bushel

Under hot, dry conditions, grain filling duration and biomass translocation from the whole plant to the ear (kernels) can be severely affected. Otherwise, a reasonable value to use is about **105,000 kernels per bushel (e)**.

The final number of kernels per bushel is affected by diverse factors such as genotype, management practices (for example, plant density), and the environment. Plant density can strongly affect the kernel weight and the number of kernels per bushel. Lower plant densities (if growing conditions are optimum) will result in lower values for kernel number per bushel. Also, expect a lower kernel number per bushel as N is more deficient. More information regarding the influence of these management practices on the kernel weight and the number of kernels per bushel is available from an article titled "Corn Grain Yield Estimation: The Kernel Weight Factor" from Dr. Tony Vyn, Purdue University, at: <http://extension.entm.purdue.edu/pestcrop/2010/issue22/index.html#corn>

Final yield: Calculation of bushels per acre

The final calculation of the potential yield to be obtained at the end of the season is simply the outcome of dividing the component (d) by (e).

Bushels per acre = 8,694,000 kernels per acre ÷ 105,000 kernels per bushel = **~83**

In this example, if projected conditions prove to be accurate, the corn should obviously be kept and harvested for grain. From previous experiences, the yield component method of estimating yields often seems to provide optimistic outcomes (slightly overestimation). If the conditions during the reproductive period are predicted to worsen (severe heat stress and lack of precipitation); then the kernel weight can be reduced, and the number estimated for component (e), kernels per bushel, should be higher. That will reduce the yield expectations.

New technologies for estimating corn yields: App

If you have smartphone or tablet devices, there is a "free" app that can provide assistance in estimating corn yield at on-farm scale. The app, developed by the University of Wisconsin, is named "Crop Calculators for Corn" and can be downloaded at:

<https://play.google.com/store/apps/details?id=ipcm.calc.cropmanager>

The Crop Calculators app has a section for estimating yields: "Grain Yield Estimator." In that section only four inputs are needed for predicting the final yield: (1) plants per 1000th acre (17.4-foot length of row); (2) rows per ear; (3) kernels per row; and (4) kernel weight, or mass. The last factor refers to the individual kernel weight for corn and it is expressed in mg per kernel. This factor normally varies from 150 to 400 mg per kernel. If conditions will be favorable until harvest, then the "kernel mass" should be higher (e.g., 300 mg per kernel). On the opposite end, unfavorable conditions with a short-grain filling period will produce a lower value (e.g., 180 mg per kernel). This factor will ultimately be defined at maturity, but a projection can be used based on forecasted weather conditions for the remainder of the season.

Links with further discussions on the yield estimation can be found at:

<http://corn.osu.edu/newsletters/2010/2010-25/201cpredicting201d-corn-yields-prior-to-harvest>

The Ohio State University

<http://www.ca.uky.edu/agc/pubs/agr/agr187/agr187.pdf>

University of Kentucky

<http://www.agry.purdue.edu/ext/corn/news/timeless/yldestmethod.html>

Purdue University

<http://corn.agronomy.wisc.edu/AA/pdfs/A033.pdf>

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Currently the Pacific Ocean is in what is known as an El Niño. El Niño is a natural climate phenomenon marked by warmer-than-average sea surface temperatures in the central and eastern Pacific Ocean near the equator.

Since 1950, there have been approximately 20 El Niño events. By historical standards, to be classified as a full-fledged El Niño or La Niña episode, a positive or negative ONI (Oceanic Niño Index) of 0.5 degrees C must be exceeded for a period of at least 5 consecutive overlapping 3-month seasons. On the other hand, the Climate Prediction Center (CPC) considers El Niño or La Niña conditions to occur when the monthly Niño3.4 OISST departures meet or exceed ± 0.5 degrees C along with consistent atmospheric features. These anomalies must also be forecasted to persist for 3 consecutive months. By either standard, we are currently in a moderate El Niño.

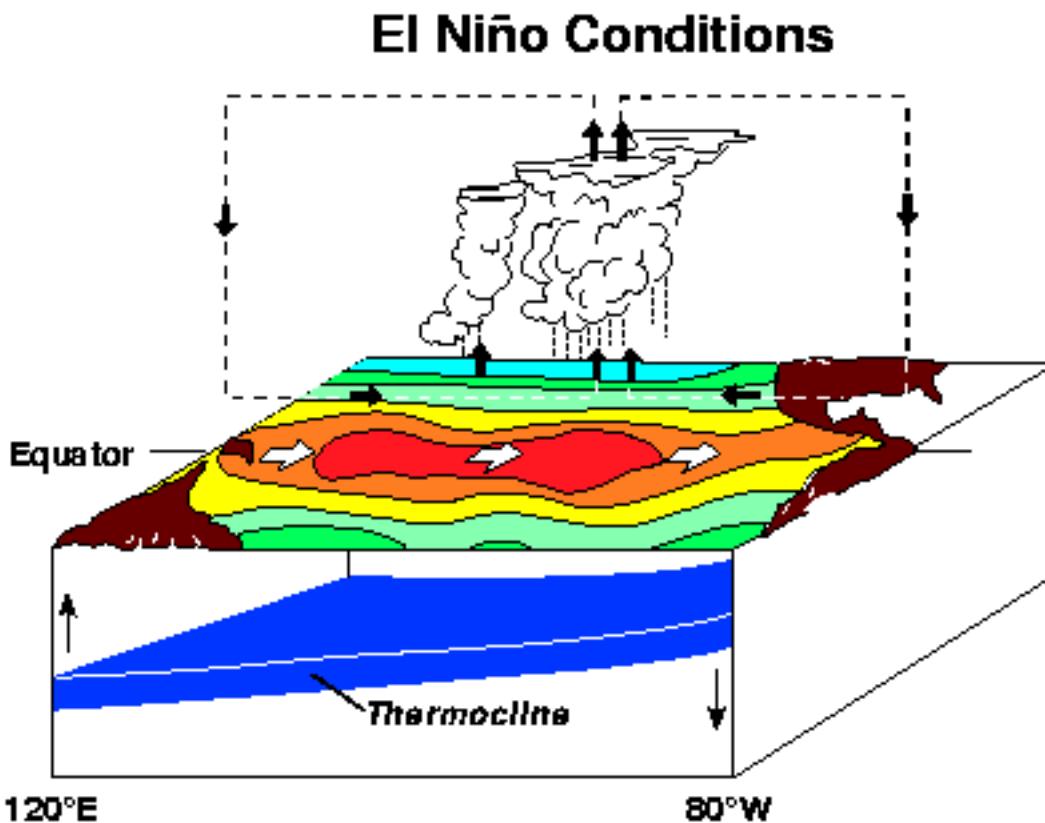


Figure 1. El Nino diagram (from NOAA)

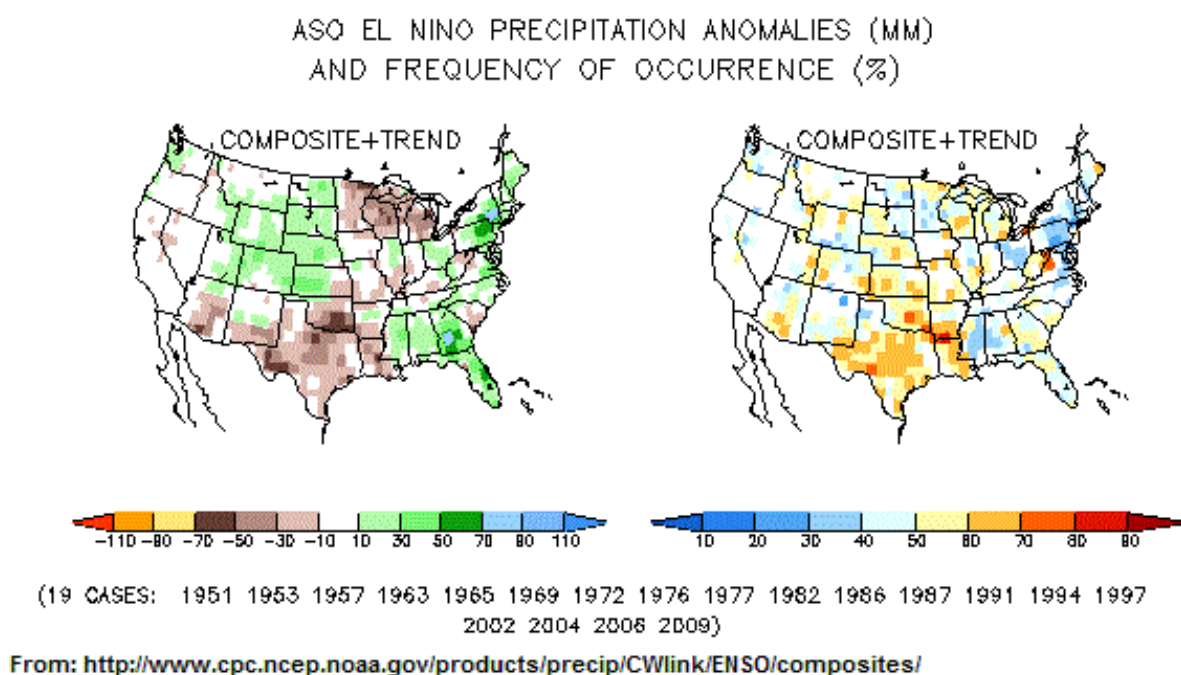
These episodes share several common attributes, including a tendency to emerge in late spring and grow in intensity through the following fall, with a typical life span of 9-12 months. The presence of El Niño can significantly influence ocean conditions and weather patterns across large portions of the globe for an extended period of time.

A typical El Niño episode affects U.S. weather patterns by shifting the Pacific jet stream - thereby altering the movement of air masses and the tracks of cyclones that determine temperature and

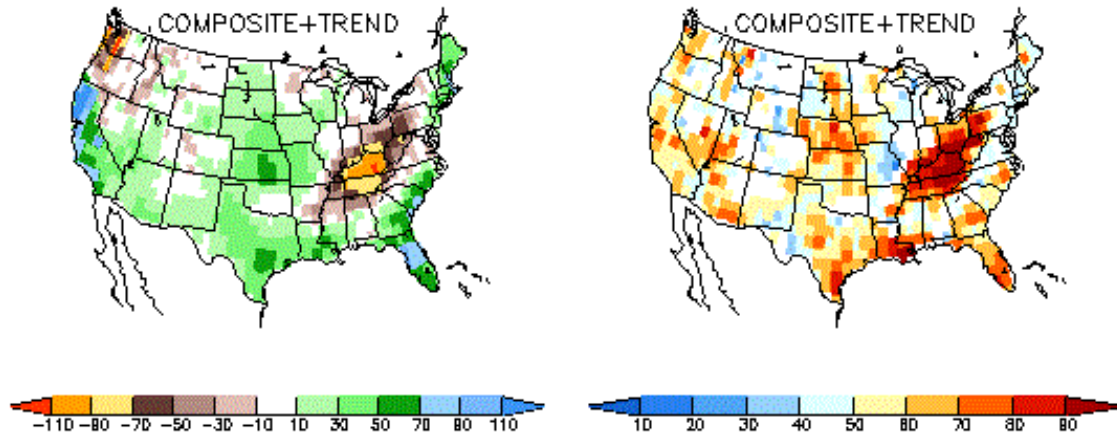
precipitation patterns. El Niño affects U.S. temperature and precipitation throughout its life cycle, though the more widespread disruptions occur in the cold season.

On average, during the cold seasons, El Niño is associated with above-average precipitation along the Gulf of Alaska coastal region, across the Southwest and the Gulf of Mexico coastal region, while drier conditions prevail across Hawaii, the Pacific Northwest, and over the Ohio and Tennessee Valley. Temperatures are typically above-average across Alaska and the northern U.S., and cooler along the Gulf of Mexico coastal region. El Niño suppresses hurricane activity in the Atlantic. It also affects central-eastern Pacific tropical storms, with a tendency for storms to recurve farther north and east into Mexico and the southwest, this can enhance the monsoon moisture in the Desert Southwest and into Kansas.

The Climate Prediction Center has a tool that compares a composite of the ENSO events to average conditions. Below are pairs of precipitation impacts over various seasons. The first map of the pair shows the anomalies, while the second shows the frequency of occurrence:



FMA EL NINO PRECIPITATION ANOMALIES (MM) AND FREQUENCY OF OCCURRENCE (%)



{12 CASES: 1953 1958 1959 1966 1969 1973 1983 1987 1992 1995 1998 2010}

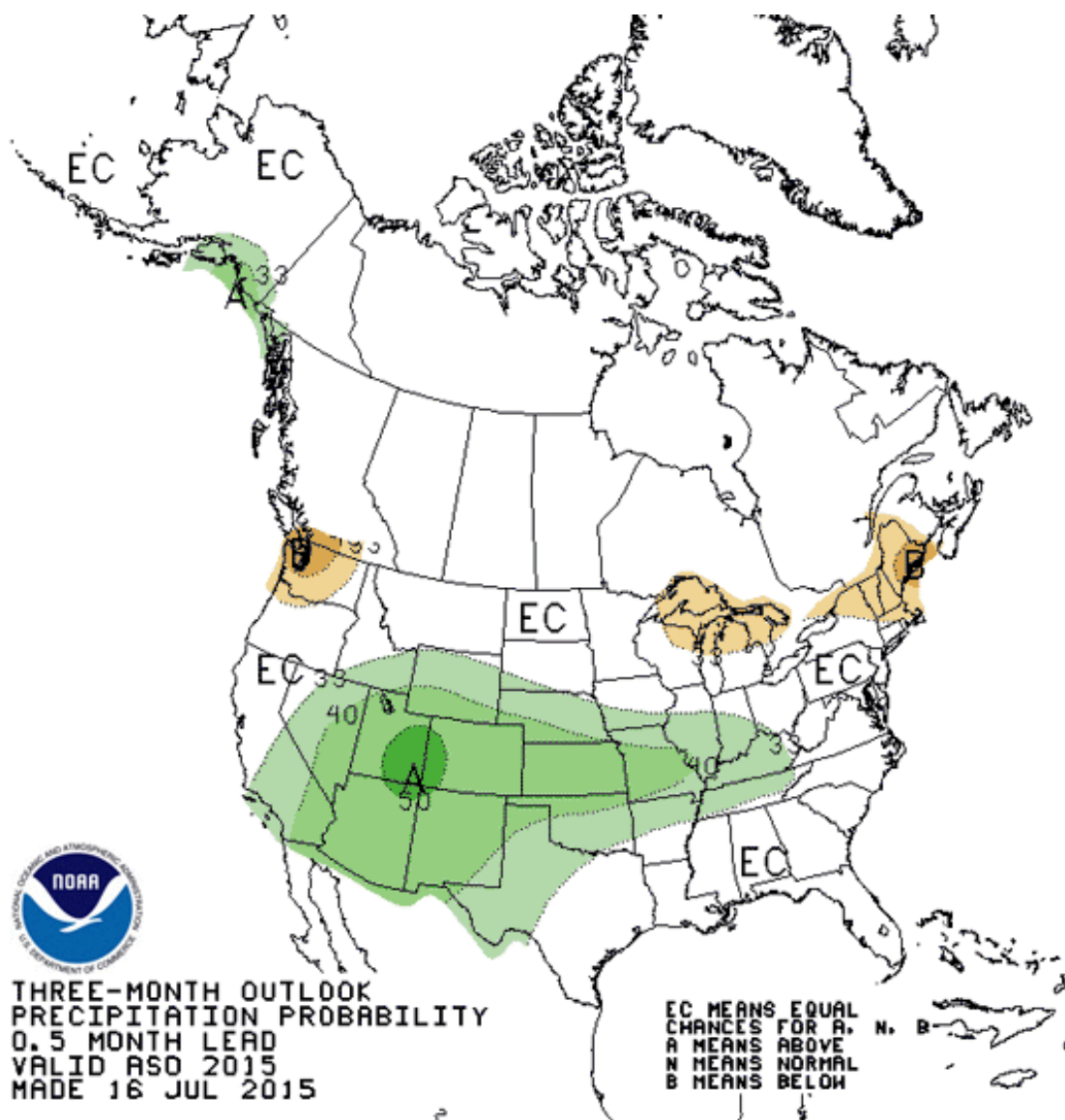
From: <http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ENSO/composites/>

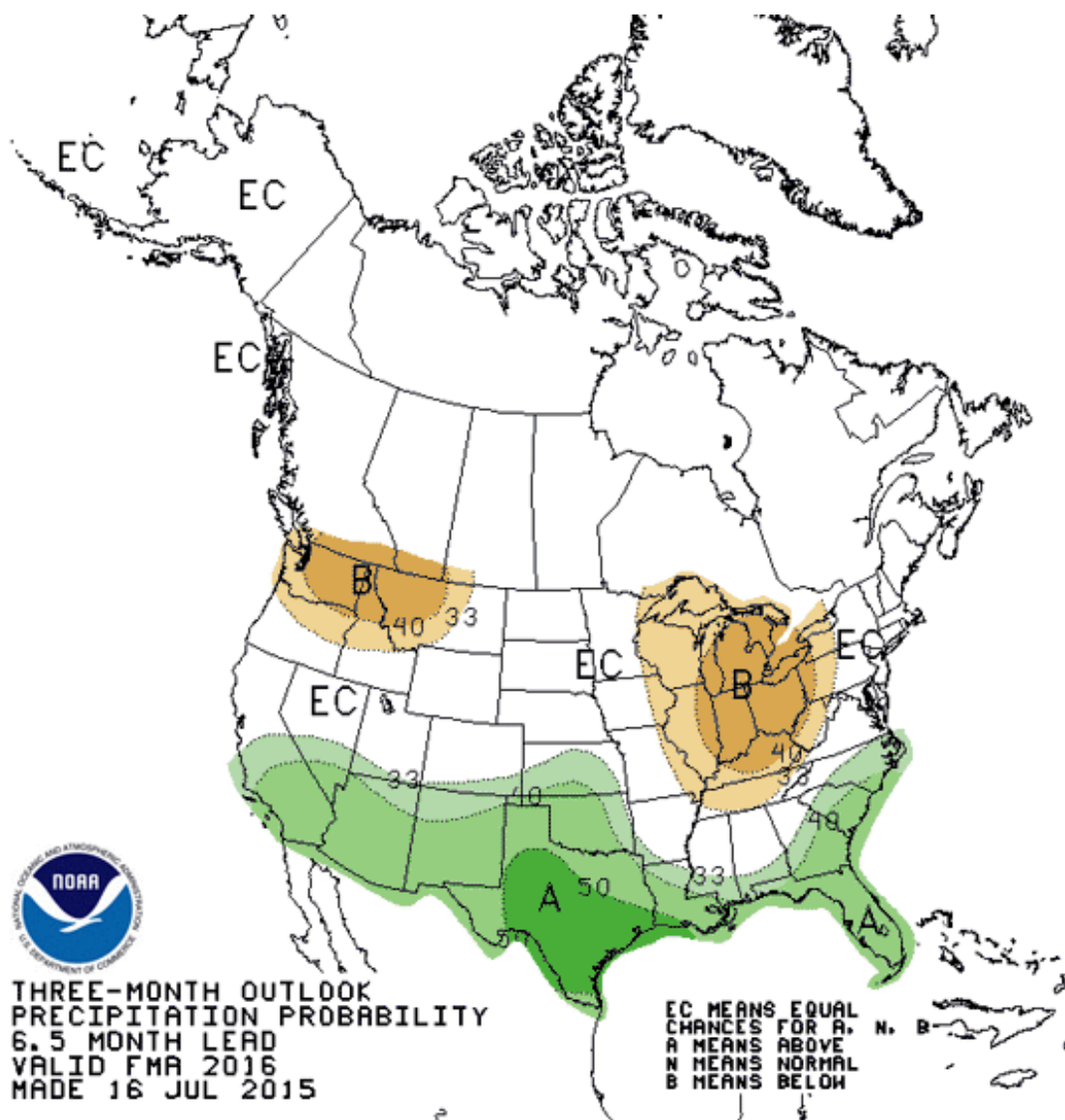
The most recent ONI value, which covers the April-June 3-month period, is 0.9 degrees C. This is considered a moderate event. The forecast is for this event to persist through the winter. The anomalies illustrated above show that Kansas tends to have wetter-than-average conditions during the autumn and late winter periods. A table of average Kansas precipitation versus selected El Niño events shows that tendency:

3 Month	ONI - Oceanic Nino Index Positive (red) = El Nino; Neutral (black); Negative (Blue) = La Nina					State-wide Average Precipitation					Long-Term Average Precipitation	Departure from Long-Term Averages				
	1983-84	1992-93	1987-88	2015-16	1993-94	1983-84	1992-93	1987-88	2015-16	1993-94	1895-2010	1983-84	1992-93	1987-88	2015-16	1993-94
Year																
DJF	2.1		1.1	0.5	0.2	3.85	3.84	3.50	2.53	5.11	2.69	1.16	1.15	0.81	-0.16	2.42
JFM	1.8	1.5	1.2	0.4	0.3	4.67	4.49	7.23	1.68	5.66	3.78	0.89	0.71	3.45	-2.10	1.88
FMA	1.5	1.4	1.1	0.5	0.5	7.43	4.75	8.10	4.07	6.36	5.69	1.74	-0.94	2.41	-1.62	0.67
MAM	1.2	1.2	1.0	0.7	0.7	10.05	6.22	11.85	11.51	10.48	8.84	1.21	-2.62	3.01	2.67	1.64
AMJ	1.0	1.0	0.9	0.9	0.8	11.61	9.57	11.10	14.31	12.50	10.96	0.65	-1.39	0.14	3.35	1.54
MJJ	0.7	0.8	1.1		0.6	8.95	14.91	12.65	11.55	19.60	12.01	-3.06	2.90	0.64		7.59
JJA	0.3	0.5	1.4		0.3	6.32	16.25	11.70		17.75	11.17	-4.85	5.08	0.53		6.58
JAS	0.0	0.2	1.6		0.2	3.97	12.52	9.88		17.23	9.57	-5.60	2.95	0.31		7.66
ASO	-0.3	0.0	1.6		0.2	6.32	7.82	7.73		9.16	8.19	-1.87	-0.37	-0.46		0.97
SON	-0.6	-0.1	1.4		0.2	7.25	7.59	4.82		6.08	6.31	0.94	1.28	-1.49		-0.23
OND	-0.8	-0.1	1.2		0.1	6.17	7.21	4.01		3.08	4.70	1.47	2.51	-0.69		-1.62
NDJ	-0.8	0.0	1.1		0.1	3.46	6.69	3.74		2.47	3.37	0.09	3.32	0.37		-0.90
DJF	-0.5	0.2	0.8		0.2	2.21	5.11	3.50		2.06	2.69	-0.48	2.42	0.81		-0.63
JFM	-0.3	0.3	0.5		0.3	5.37	5.66	7.23		1.70	3.78	1.59	1.88	3.45		-2.08
FMA	-0.3	0.5	0.1		0.5	9.99	6.36	8.10		5.72	5.69	4.30	0.67	2.41		0.03
Weather Data Library											Cumulative Deficit	-1.82	19.55	15.70	2.14	25.52

The 1987-88 El Niño event is a good analog year in that the strength of the episode during the April-June (AMJ) period is similar to 2015, and the event persisted through the winter. Note that there was a dry anomaly for the Aug-Oct (ASO), Sep-Nov (SON) and Oct-Dec (OND) periods. When comparing the ASO composite map, it is evident that the Southeastern Division has a dry pattern during this time-frame. Since this region has higher average precipitation, a dry period there will skew the state average to negative values.

Here are the Climate Prediction Center's outlooks for the ASO 2015 and FMA 2016:





A wet August-September would be favorable for establishment of the winter wheat, but could create problems with harvest for summer row crops. A wet pattern during the February-March period could keep the soil moisture profile saturated but is likely to create problems with spring field work.

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Chip Redmond, Weather Data Library
christopherredmond@ksu.edu

5. Canola schools set for August 5, 6

K-State Research and Extension will be hosting two pre-plant canola risk management schools in August. The first will be August 5 in Wichita at the Sedgwick County Extension Center. The meeting will begin at 10 a.m. The second will be August 6 in Garden City at the Southwest Research-Extension Center beginning at 9 a.m.

The purpose of the schools is to give new and experienced producers the information needed to make an informed decision about planting winter canola this fall.

Topics at the pre-plant meeting on Aug 5 include drill calibration, insect management, canola varieties and winter survival, on-farm establishment research, and marketing. Topics at the Aug 6 meeting include planting date and establishment methods, intensive management under limited irrigation, variety performance and winter survival, insect management, and marketing.

Lunch will be provided at each venue. Participants are asked to RSVP by August 3 for the Wichita school by contacting Jackie Fees, Sedgwick County Extension office, at jfees@ksu.edu or 316-660-0143. Participants can register online at: [Canola School link](#). Also, see the Sedgwick County Extension office website at www.sedgwick.ksu.edu

For the Garden City school, participants are asked to RSVP by July 30 to Ashlee Wood, at awood22@ksu.edu or 620-276-8286.

Mike Stamm, Canola Breeder
mjstamm@ksu.edu

6. Kansas River Valley Experiment Field fall field day, August 11

The Kansas River Valley Experiment Field near Rossville will host its fall field day on Tuesday, August 11. The field day begins at 6 p.m. sharp.

Field day topics and K-State presenters include:

- Starter Fertilizers with Macro and Micronutrients for Corn and Soybean – Dorivar Ruiz Diaz
- Precision Nitrogen Application for Corn – Ray Asebedo
- How to Use Herbicide Mode of Action to Avoid Resistant Weeds – Dallas Peterson
- Advances in Sudden Death Syndrome Management – Eric Adee

The field is located 1 mile east of Rossville on U.S. Hwy 24, on the south side of the road.

A BBQ meal will be provided after the field day, sponsored by Wilbur-Ellis. To pre-register, call Joanne Domme at the Shawnee County Extension office at 785-232-0062, ext. 100 by 5 p.m. on Monday, August 10.

7. East Central Experiment Field fall field day, August 19

The East Central Experiment Field in Ottawa will host its fall field day on Wednesday, August 19. The field day begins at 9 a.m. with registration, coffee and doughnuts, and the program starts at 9:30 a.m. A complimentary lunch will be served.

Field day topics and K-State presenters include:

- Benefits of Grid Soil Sampling – Dorivar Ruiz Diaz
- Cover Crops in Cropping Systems – DeAnn Presley
- Doublecrop Soybean Management – Ignacio Ciampitti and Doug Shoup
- High Yielding Wheat – Romulo Lollato

From I-35 at the Ottawa exit, the East Central Experiment Field is south 1.7 miles on Kansas Highway 59, then east 1 mile, and south 0.75 mile.

More information, including Certified Crop Advisor Credits, is available by contacting the East Central Experiment Field at 785-242-5616.

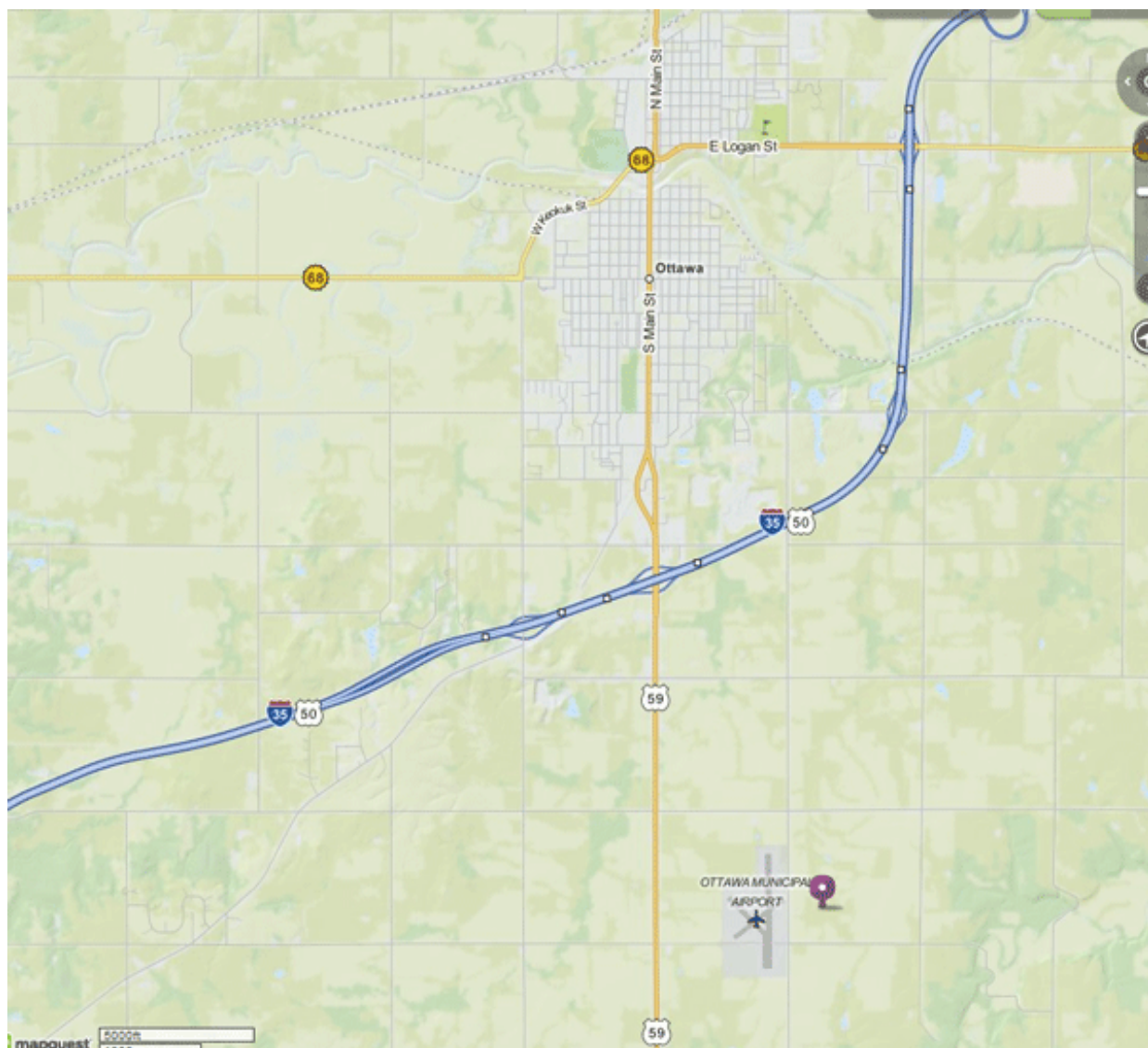


Figure 1. Location of East Central Experiment Field, south of Ottawa.

8. Comparative Vegetation Condition Report: July 14 - 27

K-State's Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. These maps can be a valuable tool for making crop selection and marketing decisions.

Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:

<http://www.youtube.com/watch?v=CRP3Y5Nlggw>

<http://www.youtube.com/watch?v=tUdOK94efxc>

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 26-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.

NOTE TO READERS: The maps below represent a subset of the maps available from the EASAL group. If you'd like digital copies of the entire map series please contact Nan An at nanan@ksu.edu and we can place you on our email list to receive the entire dataset each week as they are produced. The maps are normally first available on Wednesday of each week, unless there is a delay in the posting of the data by EROS Data Center where we obtain the raw data used to make the maps. These maps are provided for free as a service of the Department of Agronomy and K-State Research and Extension.

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

Kansas Vegetation Condition

Period 30: 07/14/2015 - 07/27/2015

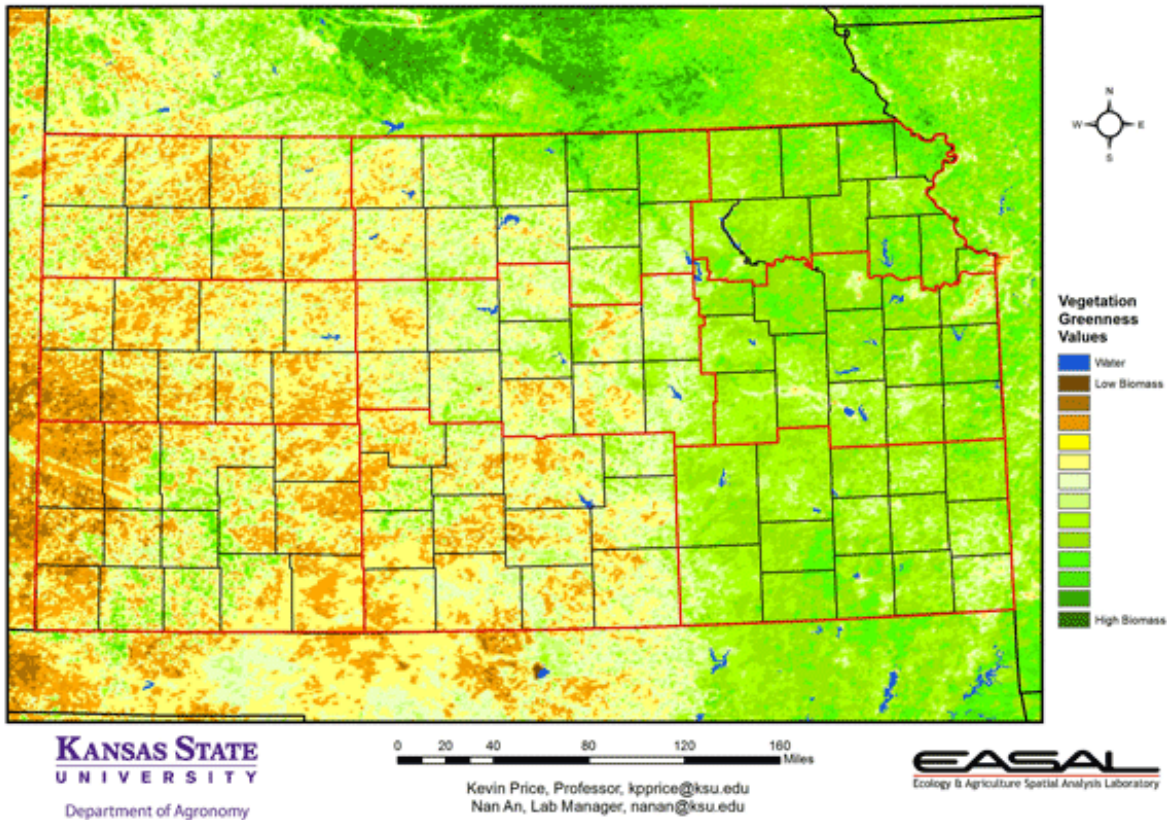


Figure 1. The Vegetation Condition Report for Kansas for July 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that while the greatest biomass production continues to be in the eastern third of the state, increased activity is visible in the northwestern division. Recent rains have eased some of the stress on vegetation in the area.

Kansas Vegetation Condition Comparison

Late-July 2015 compared to the Late-July 2014

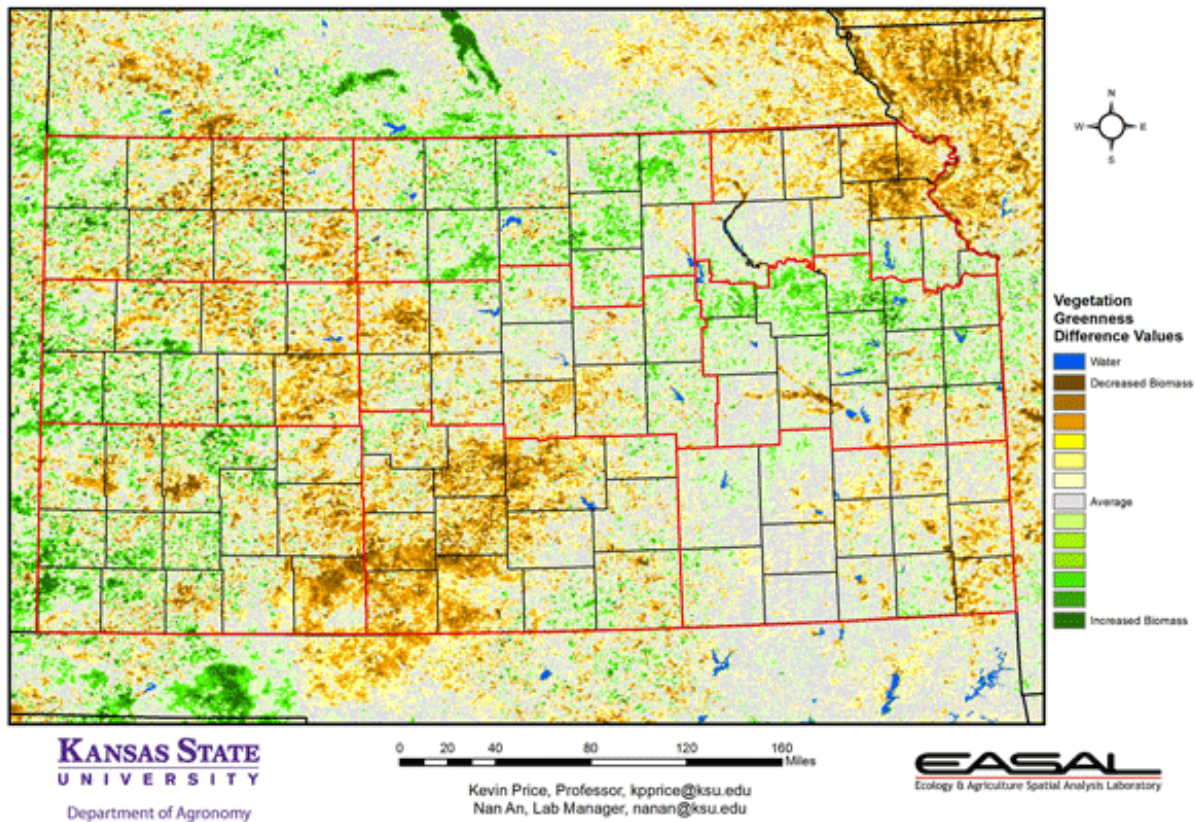


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for July 14 - 27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows western Kansas has higher photosynthetic activity. Rainfall has been above average in this area for the entire growing season. There is a sharp drop in biomass production in the eastern areas of West Central into Central KS. These regions continue to see lower-than-normal precipitation, as well as higher-than-average temperatures. In the northeast, much of the vegetation has been delayed by the wetter-than-normal conditions early in the growing season.

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Kansas Vegetation Condition Comparison
Late-July 2015 compared to the 26-Year Average for Late-July

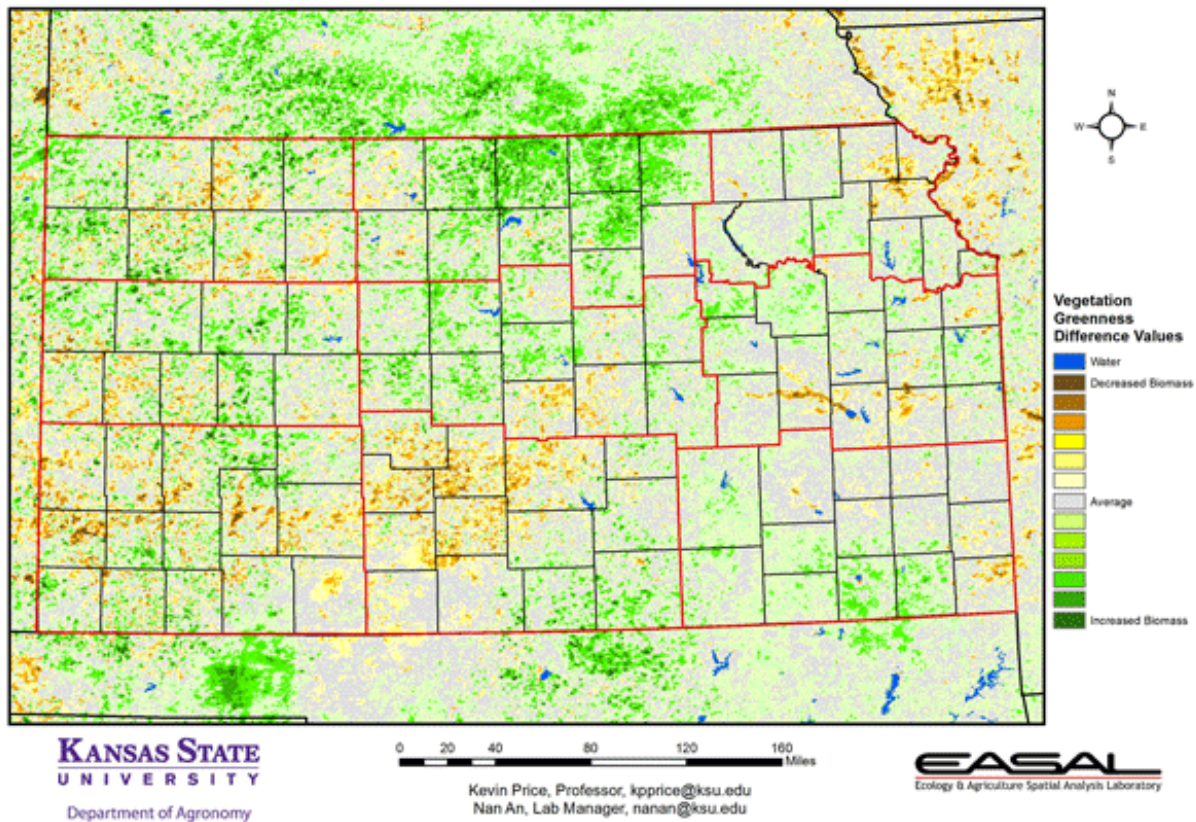


Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for July 14 - 27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state has average to above average biomass production. The biggest decrease in centered south of the Arkansas River in Edwards, Stafford, and Pratt counties. Vegetation in that area is more susceptible to short-term rainfall deficits, due to the sandy soils in the region.

U.S. Corn Belt Vegetation Condition

Period 30: 07/14/2015 - 07/27/2015

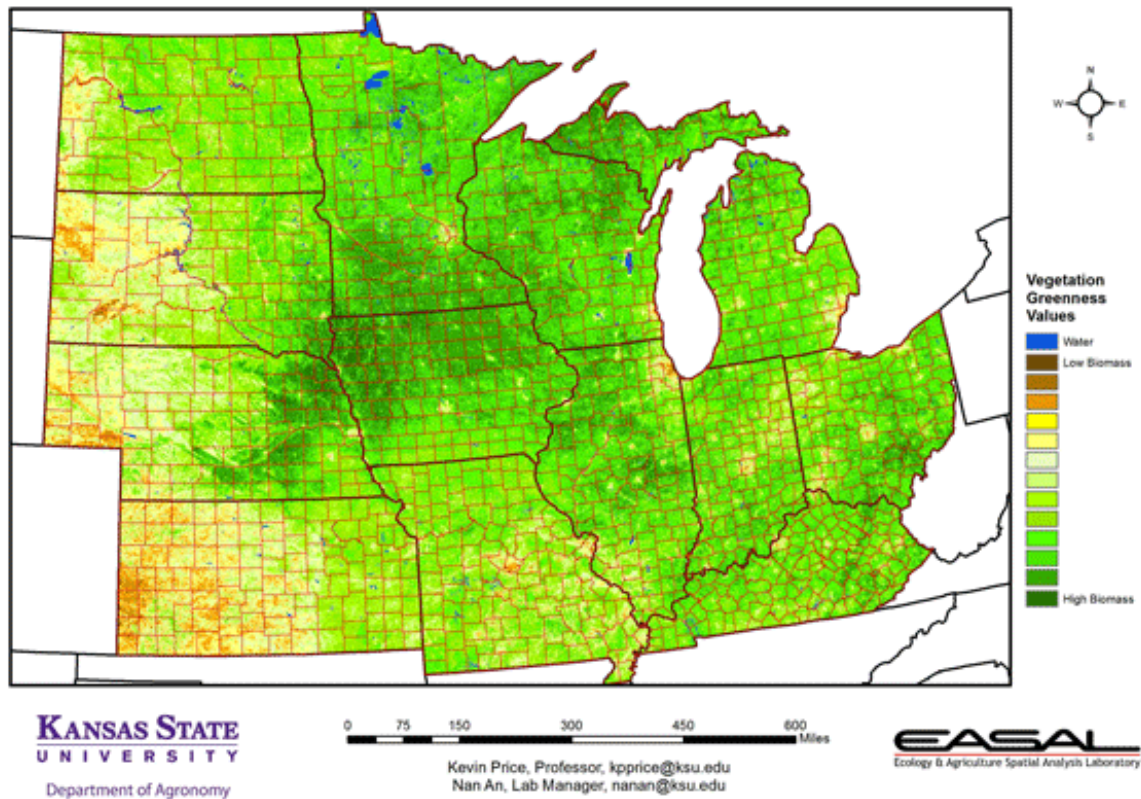


Figure 4. The Vegetation Condition Report for the Corn Belt for July 14 – 23 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest photosynthetic activity continues to be centered from central Nebraska through the Upper Peninsula of Michigan. Favorable precipitation and temperatures have spurred biomass production in these areas. In Iowa, 83 percent of the corn and 76 percent of soybeans are reported in good to excellent condition.

U.S. Corn Belt Vegetation Condition Comparison Late-July 2015 Compared to Late-July 2014

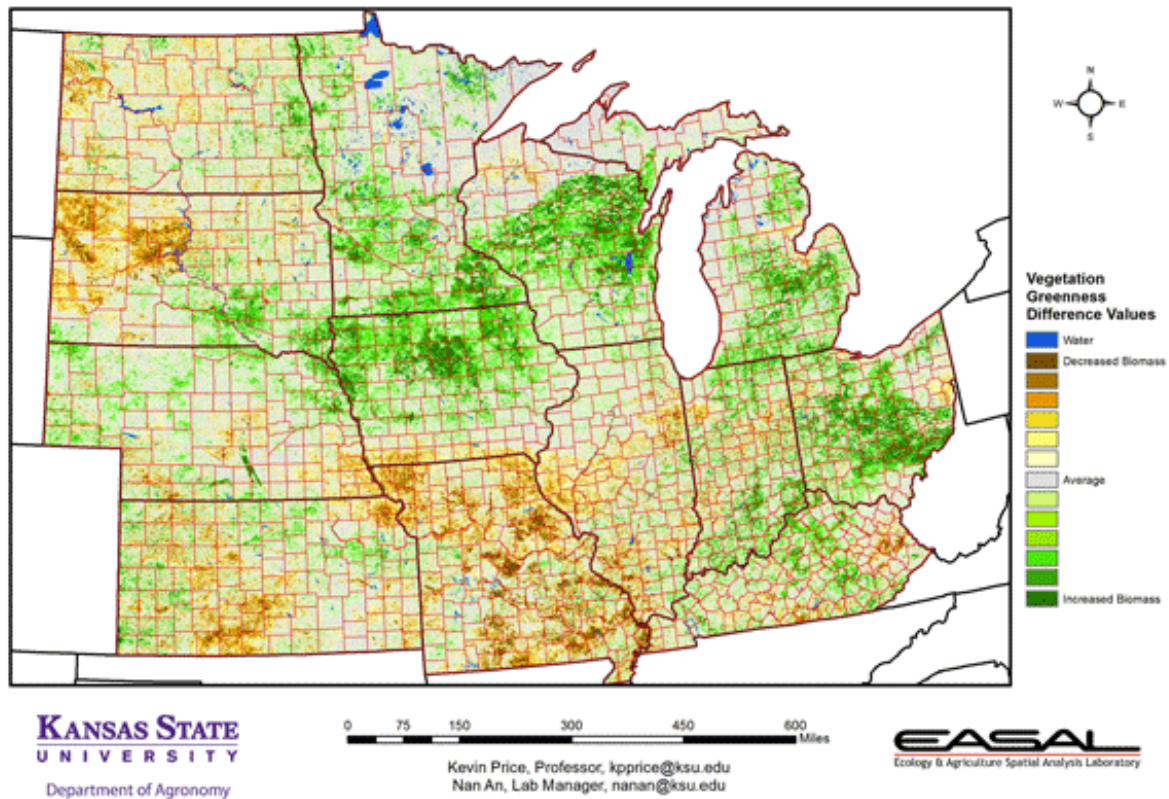


Figure 5. The comparison to last year in the Corn Belt for the period July 14 -27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the biggest decrease in biomass production is concentrated in Missouri. Excess moisture continues to play a major role. The latest reports from the USDA's National Agricultural Statistics Service show 47 percent of the state has surplus topsoil moisture. In contrast, areas from Nebraska through southern Minnesota have benefitted from a favorable weather pattern and show much higher photosynthetic activity than last year.

U.S. Corn Belt Vegetation Condition Comparison
Late-July 2015 Compared to the 26-Year Average for Late-July

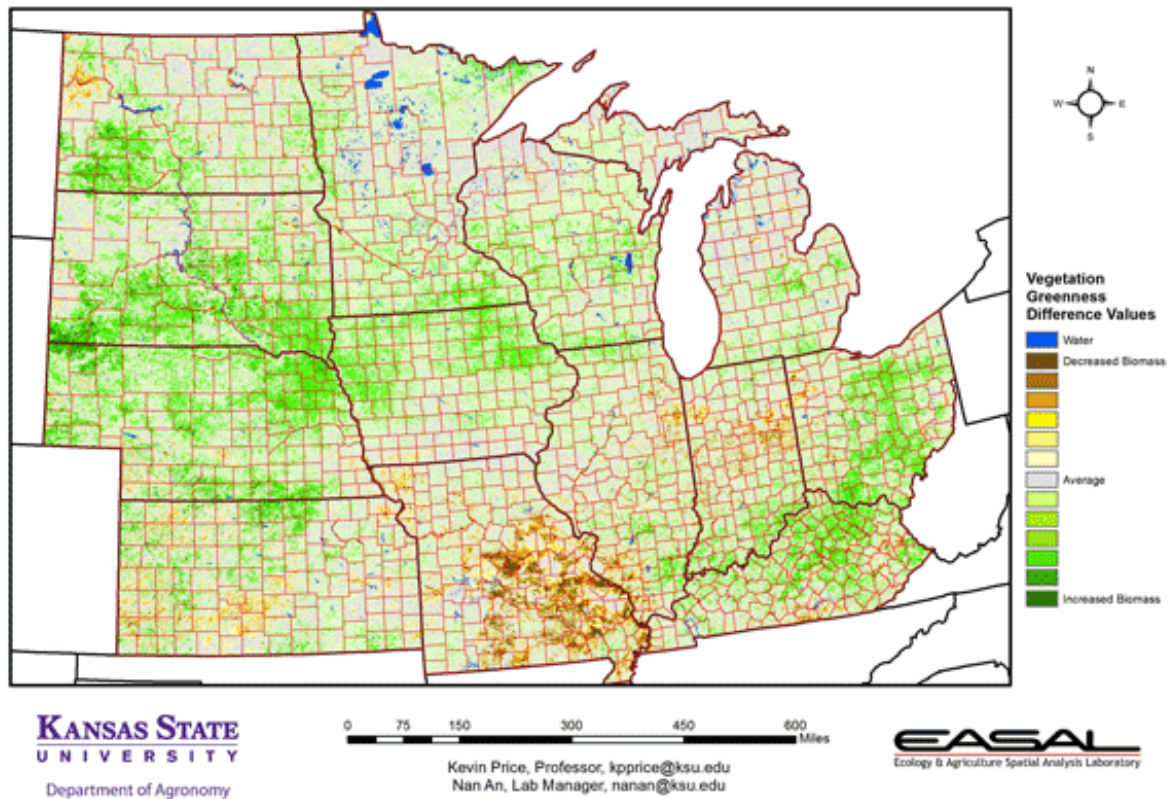


Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for July 14-27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the greatest decrease in biomass production is in southeastern Missouri. Excess soil moisture and delayed plantings have hampered biomass production in this area. In contrast, the favorable moisture in the central portions of the region has resulted in above-average photosynthetic activity.

Continental U.S. Vegetation Condition

Period 30: 07/14/2015 - 07/27/2015

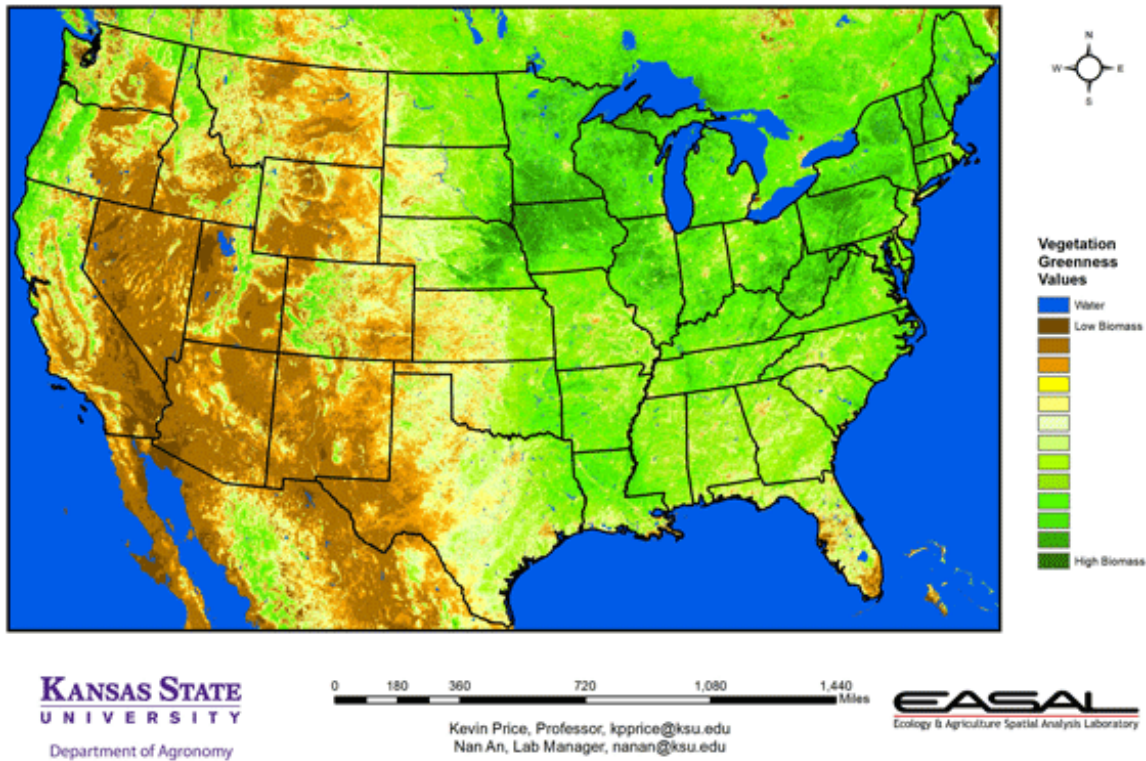


Figure 7. The Vegetation Condition Report for the U.S. for July 14-20 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest photosynthetic activity is concentrated from the Northern Plains to New England. Lower biomass production is visible in the Pacific Northwest into Montana. It is particularly notable in the Olympic Peninsula in Washington.

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Continental U.S. Vegetation Condition Comparison Late-July 2015 Compared to Late-July 2014

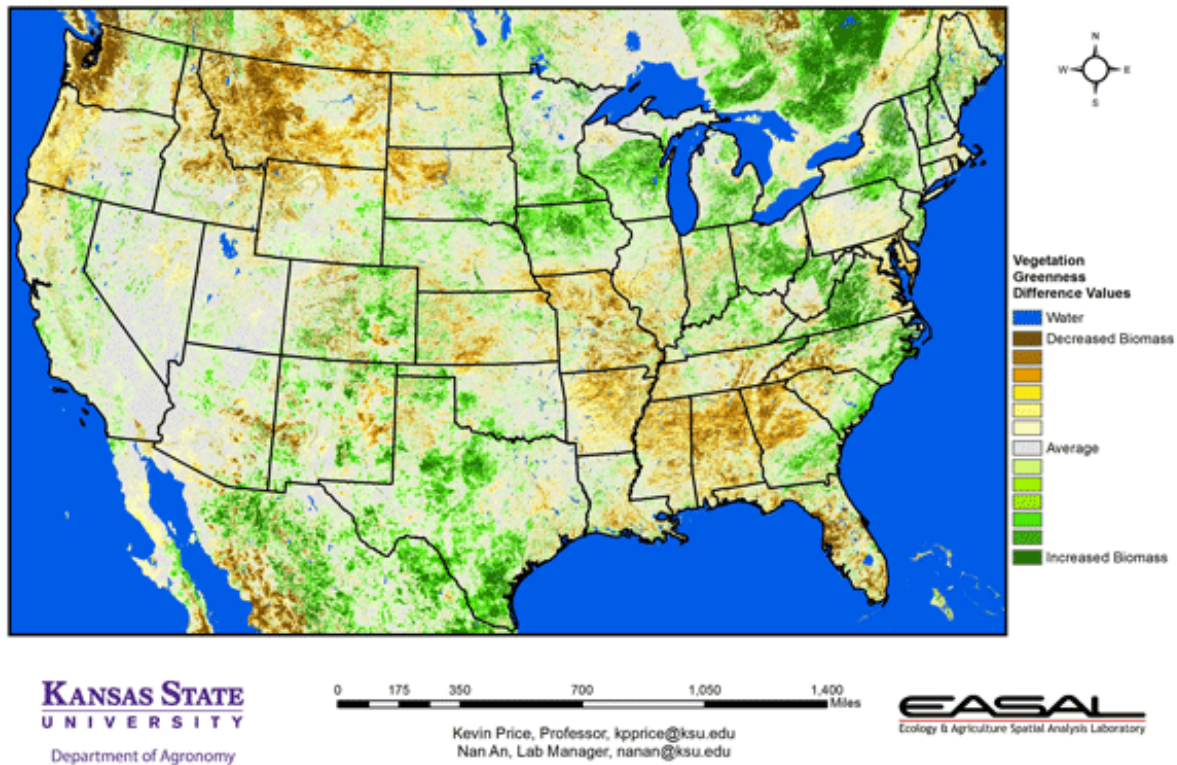


Figure 8. The U.S. comparison to last year at this time for the period July 14-27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the Pacific Northwest continues to have much lower biomass production. The expanding drought is greatly reducing photosynthetic activity in the region. Increased photosynthetic activity is most notable in the Upper Midwest, where a more favorable precipitation pattern has prevailed this year. The lower photosynthetic activity in the Missouri is mainly due to excess moisture.

Continental U.S. Vegetation Condition Comparison
Late-July 2015 Compared to 26-year Average for Late-July

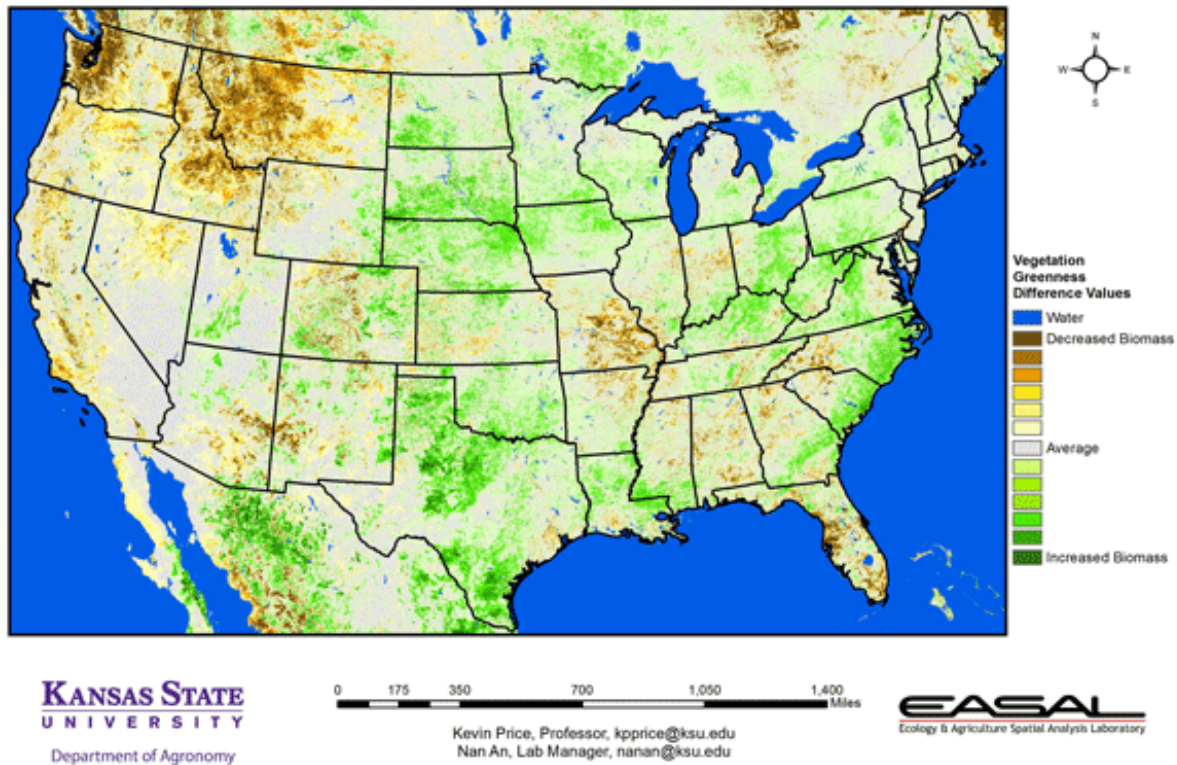


Figure 9. The U.S. comparison to the 26-year average for the period July 14-27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that higher-than-average biomass production dominates the Plains from South Dakota through Texas. In contrast, the Pacific Northwest has much lower photosynthetic activity, as drought continues to intensify in this region. Pockets of lower photosynthetic activity are also visible in western Florida, where drought is also intensifying. In contrast, the lower photosynthetic activity centered in Missouri is due more to excess moisture than drought.

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