



K-STATE
Research and Extension

Extension Agronomy

eUpdate

08/07/2015

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. Strategies for managing low-quality wheat seed: The case of low test weight

The 2014-15 wheat harvest was delayed in some parts of Kansas due to precipitation after the kernels achieved physiological maturity, which resulted in wetting and drying of mature kernels still in the spike. A direct consequence of wetting and drying of mature wheat kernels is a decrease in test weight, which is a measure of kernels' volume weight or bulk density.

Test weight can be decreased in two different ways in moistened mature wheat kernels.

- First, kernels may swell due to moistening, causing the seed coat to loosen irreversibly. The seed coat later wrinkles with drying and the kernel may not return to its original size, affecting kernel packing and ultimately decreasing test weight.
- Secondly, precipitation can initiate the germination process in the moistened kernel and cause starch to be digested, leaving small voids inside the kernel which decreases test weight. Under these circumstances, pre-harvest sprouting may occur in some varieties.

The extent of the decrease in wheat test weight depends on how many times it rained between optimal harvest time (wheat at harvest maturity) and actual harvest time. The greater the number of rainfall events, the greater the decrease in test weight.

Other factors that may lead to low test weight include suboptimal fertility, such as a nitrogen deficit; root and crown rots; insect damage to foliar and stem tissue; drought, waterlogging, or heat stresses during grain filling; lodging; and diseases that decrease leaf area or grain quality. In 2015, stripe rust, leaf rust, and *Fusarium* head scab were among the most common disease factors in reducing leaf area or grain quality – and ultimately test weight.

Seed wheat should have a test weight above 57 pounds per bushel for adequate germination under a wide variety of conditions. Seed with slightly lower test weight may be used to sow next year's crop if necessary. If the test weight is below 55 pounds per bushel, however, producers will want to take certain steps to help increase the chances of getting a good stand. Low-test-weight seed usually germinates well, but seedlings tend to have lower vigor than seedlings from seed with higher test weights. Therefore, producers should take special care to try to get a good, uniform stand.

Drill speed. Using a drill speed of 5 mph will help ensure that the seed is placed down in the seed slot, and that the seed slice is closed and firmed properly, making for good seed-soil contact. Getting good seed-soil contact will help the seedlings develop a good primary and secondary root system. Also, when drill speeds are too fast, the openers tend to "ride up" at times, resulting in a planting depth that is shallower than intended.

Seeding depth. All wheat should be planted at the proper depth for best stands. But it is especially important that low-test-weight seed is not planted too deeply, since this seed has low emergence vigor to start the growing season. It is equally important not to plant too shallowly. Shallow-planted wheat often has more difficulty establishing a good root system in the fall than wheat planted at the proper depth, and this can be an even greater problem when using low-test-weight seed. Plant low-test-weight seed 1 to no more than 1.5 inches deep.

Seeding rates. Usually, the lower the test weight, the more seeds there are per pound. Producers who use a planting rate based on the number of pounds per acre should not adjust their seeding rate

when planting low-test-weight seed. They will end up planting more seeds per acre, but emergence is often somewhat lower with low-test-weight seed, so the stand should come out about normal. If the cause of low test weight include fungal diseases such as *Fusarium* head scab, which decrease wheat germination rate, an increase in seeding rate may ensure a good and uniform stand.

Seed treatments. Fungicide seed treatments may improve germination or seedling vigor of low-test-weight seed, and protect against certain diseases. See the accompanying article in this issue of the eUpdate for more information.

Seed cleaning. Producers should make every effort to have their seed cleaned as thoroughly as possible to remove scabby kernels and shriveled seed. This may help increase the test weight and improve emergence and seedling vigor. Adjusting the settings during seed cleaning to blow lighter seed away can add 1 to 2 pounds to the seed lot's test weight by removing the small kernels. However, if the majority of the kernels are lighter and shriveled, the potential of gaining much test weight is limited.

Germination testing. Where possible it would be desirable to have the seed germination evaluated by a seed-testing lab. The turnaround time for this type of testing is generally 7 to 14 days once the seed-testing lab receives the sample. The variation in the turnaround time depends on the need for pre-chilling treatment prior to the germination test. The need for pre-chilling typically ends around Labor Day weekend. The cost of testing at the Kansas Crop Improvement Association (KCIA) is \$17.00 for the standard warm germination test. Growers or others can contact KCIA by phone at 785 532-6118, or by email at kscrop@kansas.net.

On-farm germination tests may be an option for growers who do not have time to have seed evaluated by a seed-testing lab. This topic is addressed in a previous Agronomy e-Update article: https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=618.

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2. When fungicide wheat seed treatments may be advisable

Fungicide seed treatments are advisable if seed is infected with *Fusarium* head scab, or other diseases such as loose smut, common bunt, or black point. Fungicide seed treatments are also advisable for wheat planted in fields with reported flag smut. Generally speaking, fungicide seed treatments can help improve germination and seedling vigor of wheat seed infected with scab, as well as bunt, loose smut, and black point. In the case of flag smut, seed treatments will help prevent the re-occurrence of this disease. Fungicide seed treatments are also advisable if seeding dates are unusually early or late; in no-till situations, or on low-test-weight seed simply to protect the seed against seed-borne diseases, seed rots, and seedling blights that may reduce vigor beyond the already reduced vigor in a low test weight seed.

Fusarium head scab of wheat was a problem in parts of Kansas in 2015. Some areas reported seed quality problems, with germination rates below 80 percent. Seed lots with germination below 80 percent are strong candidates for a fungicide seed treatment, or at least increased seeding rates to compensate for the low germination. More information about using wheat damaged by *Fusarium* for seed can be found in a previous Agronomy e-Update article:

https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=617.

Producers and others can get the latest information on seed treatments in the newly revised version of *Seed Treatment Fungicides for Wheat Disease Management 2015*, K-State Research and Extension publication MF2955 at: <http://www.bookstore.ksre.ksu.edu/pubs/MF2955.pdf>

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3. Test wheat seed germination if harvest aid herbicides were used

May rains brought on weeds and delayed wheat harvest in some areas of Kansas to the extent that herbicide applications had to be made to burn down weeds prior to harvest. Farmers intending to hold back some of their harvest for use as seed this fall should have that wheat tested for germination.

Some herbicides, such as glyphosate, are not recommended on wheat to be saved as seed. Most, if not all, of the common herbicides used as pre-harvest aids in wheat require that the grain be below 30 percent moisture before application. At or below this moisture content, the grain is post-physiological maturity and unlikely, or less likely, to be adversely affected. Seed germination can be greatly inhibited if pre-harvest herbicide applications are made at an improper stage of grain maturity.

The only way to be sure that germination has not been harmed by herbicide application is to have the seed tested by a professional laboratory such as Kansas Crop Improvement Association's (KCIA's) Seed Quality Testing Lab.

Producers may be tempted to conduct their own germination test, but home tests may not provide enough information. Whether seed germination has been harmed by a herbicide is really only part of the story. Seed germination is relatively easy to conclude from a germination test. What is not quite so obvious is the potential damage that may have been done to seed even though it appears to germinate.

The trained analysts at KCIA evaluate each seedling in a test to make sure it has all the essential structures to establish a plant in the field. The lack of roots or a damaged coleoptile resulting from a herbicide application can affect that seed's ability to establish itself when planted.

It would be good if every producer planted Kansas certified seed, which has been professionally cleaned and tested, but if a producer has a legal right to use saved seed, we think it is a prudent step to have that seed professionally tested.

Information on KCIA seed laboratory services can be found at www.kscrop.org/labservices.aspx or, call 785-532-6118.

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4. Forecasted corn yield potential for Kansas: Model projections on July 29

Most of the corn in Kansas is in the reproductive stages now. The latest Kansas Agricultural Statistics Service crop progress report (August 3) projected that 90% of the Kansas corn crop is at the silking stage, with 35% of the crop already at the dough stage, behind that of last year (49%). The USDA classified the corn as 49% good and 10% excellent. In several areas of the state, corn is looking above average and getting to the mid-grain filling period.

Potential vs. attainable yields in corn

Three weeks ago (July 17, 2015) a summary of the forecasted corn yields was presented in the Agronomy eUpdate for selected locations around the state ([Forecasted Corn Yield Potential](#); Figure 1). A new round of simulations was performed by lead investigators at the University of Nebraska in collaboration with Extension educators around the Corn Belt. The change in the median yield potential (Y_p) since the last forecast is presented in Table 1 as a way to understand the impact the weather has had on projected corn yields during the last three weeks. Simulated current corn growth stages are also presented in Table 1. All evaluated sites are in the reproductive stage, from blister (R2 stage; 10-14 days after flowering, grain moisture 85%) to dough (R4 stage; 24-28 days after flowering, grain moisture 70%) stages.

As the crop matures, the yield range observed between the low end and high end in Table 1 will converge toward the median yield value.

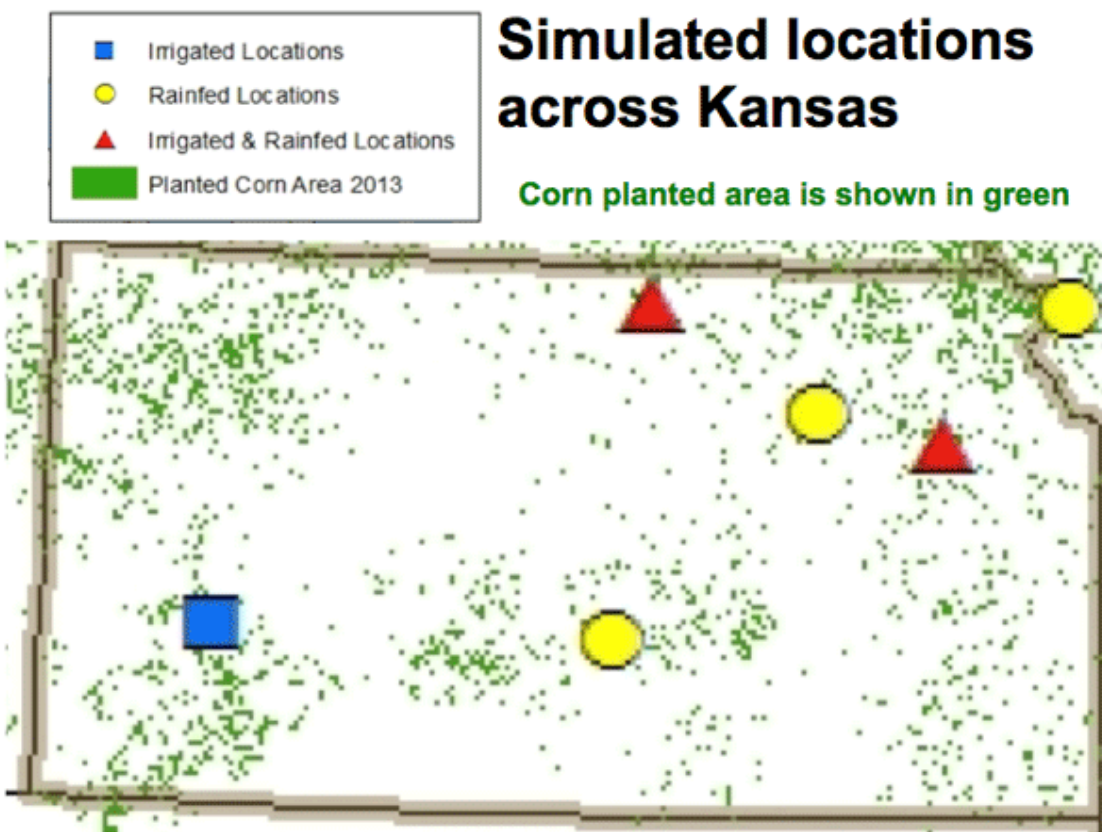


Figure 1. Locations utilized for simulation purposes for Kansas.

The corn simulation model Hybrid-Maize Model (<http://hybridmaize.unl.edu>) presents reliable estimations under well-managed conditions, with optimum planting time and good stand uniformity, and without the influence of biotic or abiotic stresses (e.g., hail, flooding, diseases, weeds, and insects). Under stress conditions, we can expect that the model will overestimate yields. Under severe stress conditions such as heat and drought during the early reproductive period, a good deal of kernel abortion is expected. The model does not take into account the effect of these kind of stress conditions on reproductive structures such as the kernels.

The impact of current weather conditions was reflected in the simulation performed on July 29. Simulations performed during the past week in all six locations around the state (Garden City, Hutchinson, Silver Lake, Manhattan, Scandia, and St. Joseph, Mo.) for both dryland and irrigated environments show mostly only minor or no changes in yield potential compared to the results from the model simulations performed on July 20. All sites are near or above the mean relative to long-term yield potential. Again, the model does not account for a direct impact of stress conditions on the kernel abortion process and final grain number. The estimated impact on yield can be even higher if conditions become severe enough to impact the final grain number component.

Still, as emphasized in the first round of the corn forecasted yields, 2015 potential corn yields are promising regardless of the weather conditions experienced from now until harvest.

Table 1. 2015 In-season Yield Potential Forecasts for Kansas (July 29)

Location	Water regime	Long-term average Yp (bu/ac) ⁱⁱ	Range of Yp forecasts as of July 15 th (bu/ac) ⁱ		Probability (%) of 2015 yield to be:			Simulated current crop stage ^a
			25 th	75 th	Below (relative to the long-term Yp) ⁱ	Near	Above	
Manhattan KS	Dryland	146	145	165	3%	64%	33%	R4, Dough
Scandia, KS	Irrigated	218	211	242	3%	69%	28%	R2, Blister
	Dryland	146	154	175	0%	38%	62%	R2, Blister
Silverlake, KS	Irrigated	204	176	205	41%	59%	0%	R4, Dough
	Dryland	151	137	156	24%	69%	7%	R4, Dough
Hutchinson, KS	Dryland	111	99	113	32%	68%	0%	R4, Dough
Garden City, KS	Irrigated	191	188	210	3%	73%	24%	R2, Blister
St Joseph, MO	Dryland	165	191	202	0%	20%	80%	R2, Blister

Conclusions

Yield forecasts from 6 locations across Kansas (also including St. Joseph, Mo.) indicate above-average corn yield potential for the current season as compared with the long-term average. Yield forecasts can go up if favorable conditions occur throughout August. Stress conditions impacting corn in the next coming weeks will be likely to reduce yields via an impact on the final kernel weight. However, these conditions on corn yield will have less effect on yields as the crop progresses into later reproductive stages. From now on is a perfect time to perform yield estimations following the method presented in our previous Agronomy eUpdate article on July 31:

https://webapp.agron.ksu.edu/agr_social/eu_article.throck?article_id=644

You can read the full paper related to forecasted yields across the Corn Belt at:

<http://cropwatch.unl.edu/hybrid-maize-july-29-yield-forecast>

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5. 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.

6. North Central Kansas Experiment Fields fall field day, August 18

The North Central Kansas Experiment Fields Fall Field Day will be held Tuesday, August 18 at the Scandia field approximately 2.5 miles west of Scandia on U.S. Hwy 36. The Field Day will start at 6 p.m. sharp.

Field Day Topics:

- The Year in Review and Weed Control Challenges
- Optical Sensor Based Nitrogen Management in Corn
- Soybean Response to Phosphorus Fertilization in corn
- Soil Water Depletion by Cover Crop Species and Mixtures

A meal, compliments of K-State Research and Extension, will follow the presentations. For more information, contact the North Central Kansas Experiment Field at 785-335-2836.

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.

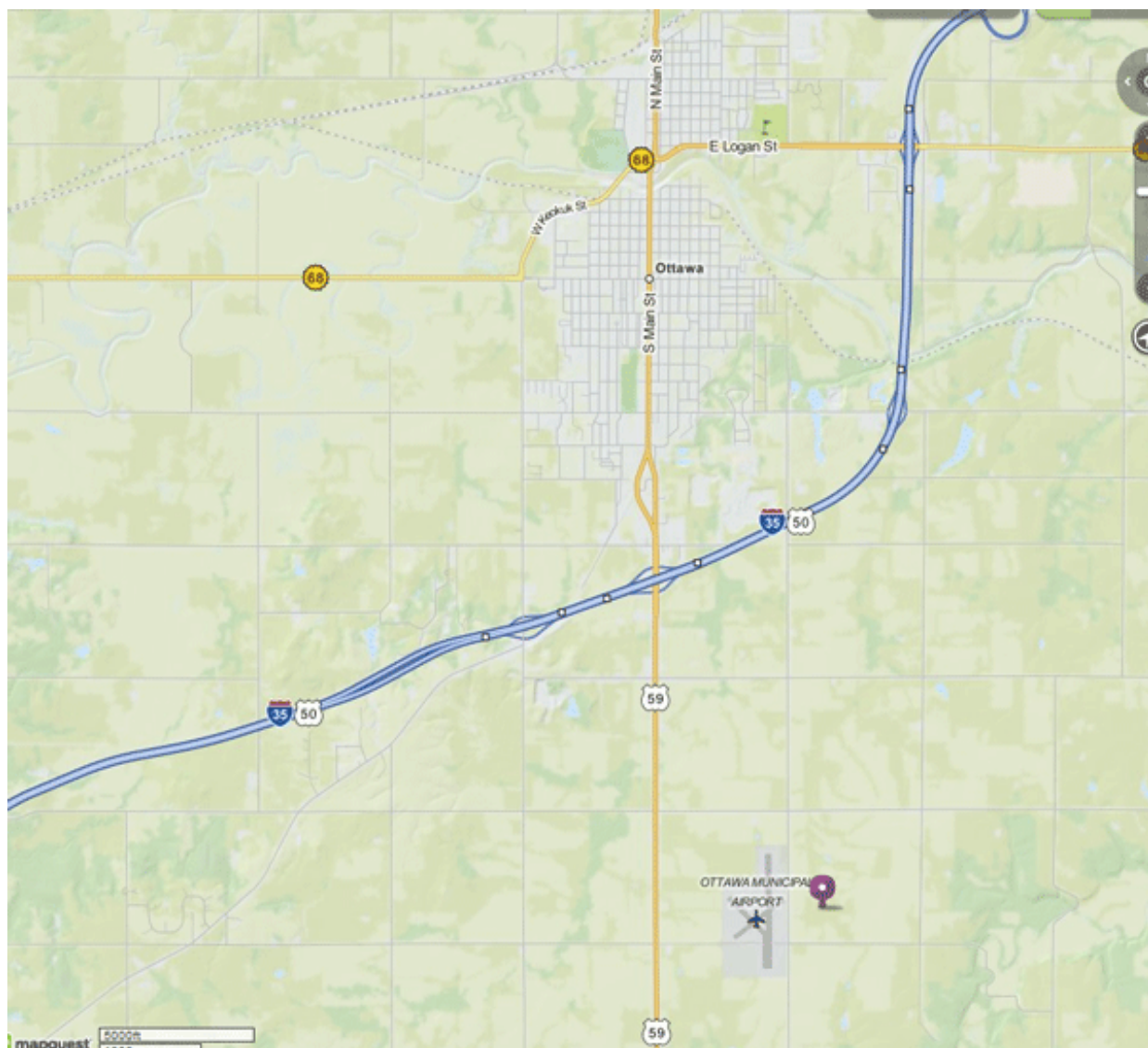


Figure 1. Location of East Central Experiment Field, south of Ottawa.

8. Comparative Vegetation Condition Report: July 21 - August 3

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 31: 07/21/2015 - 08/03/2015

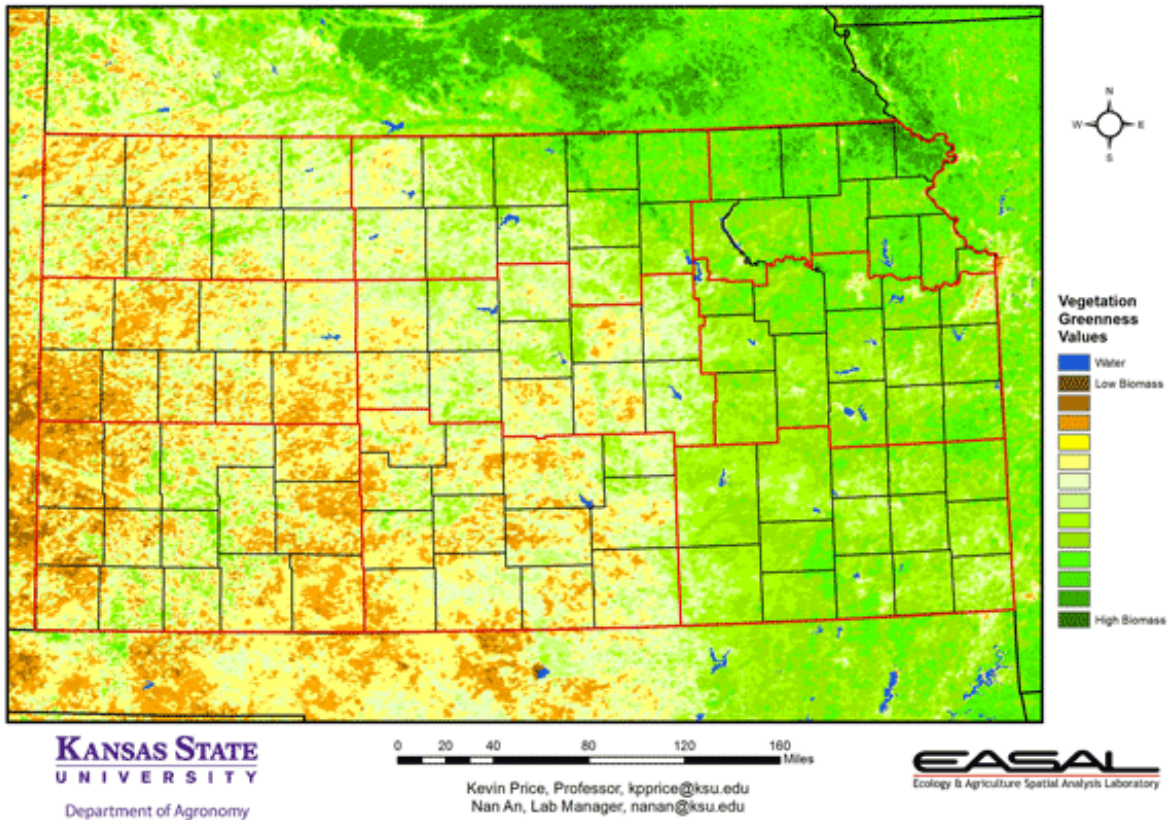


Figure 1. The Vegetation Condition Report for Kansas for July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the highest biomass production is in eastern Kansas. High NDVI values in the Republican River Valley are evident, as well as in Brown and Doniphan counties. Favorable soil moisture has moderated the impact of the recent warm weather in these areas.

Kansas Vegetation Condition Comparison
Late-Jul/Early-Aug 2015 compared to the Late-Jul/Early-Aug 2014

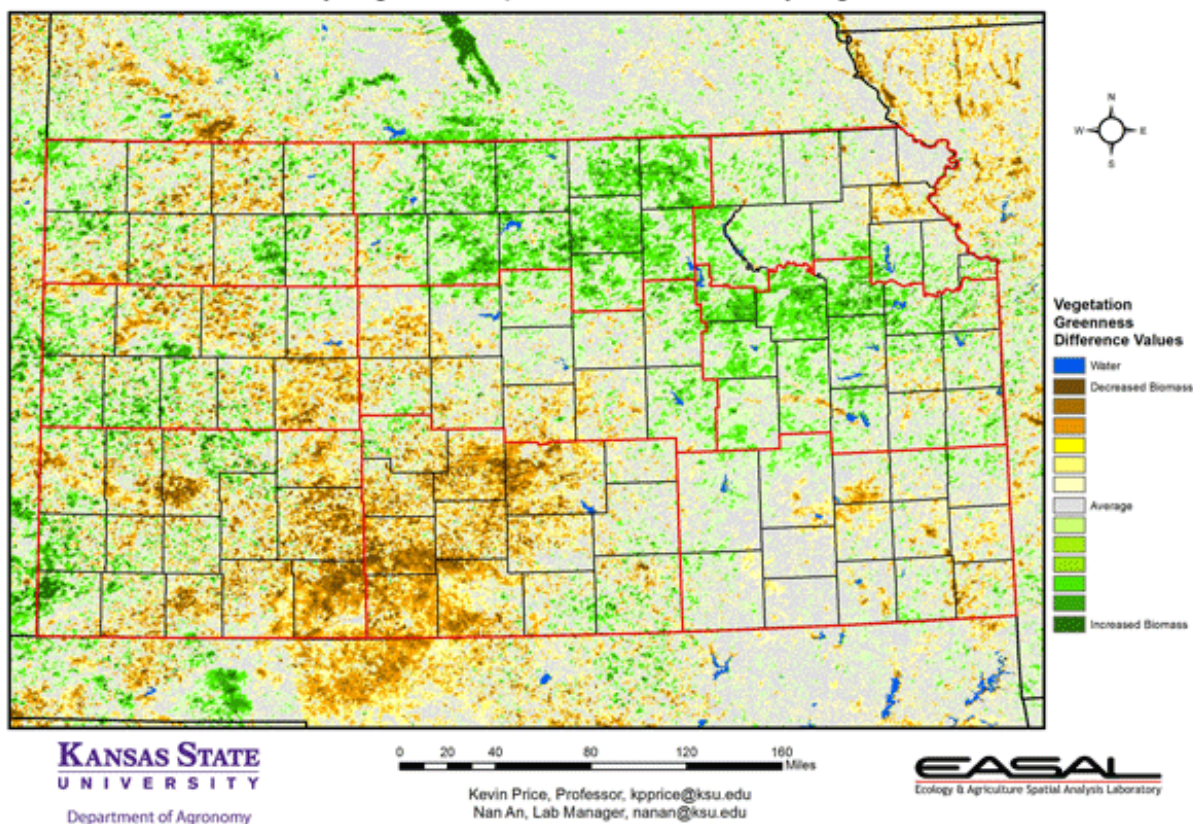


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows parts of southwest and south central Kansas have lower photosynthetic activity. These areas did not have as much moisture in recent weeks as counties farther west. In contrast, the North Central Division has had more favorable conditions this year. Last year, the divisional average precipitation was just 32 percent of normal in July. This year the division averaged 101 percent of normal for July.

Kansas Vegetation Condition Comparison

Late-Jul/Early-Aug 2015 compared to the 26-Year Average for Late-Jul/Early-Aug

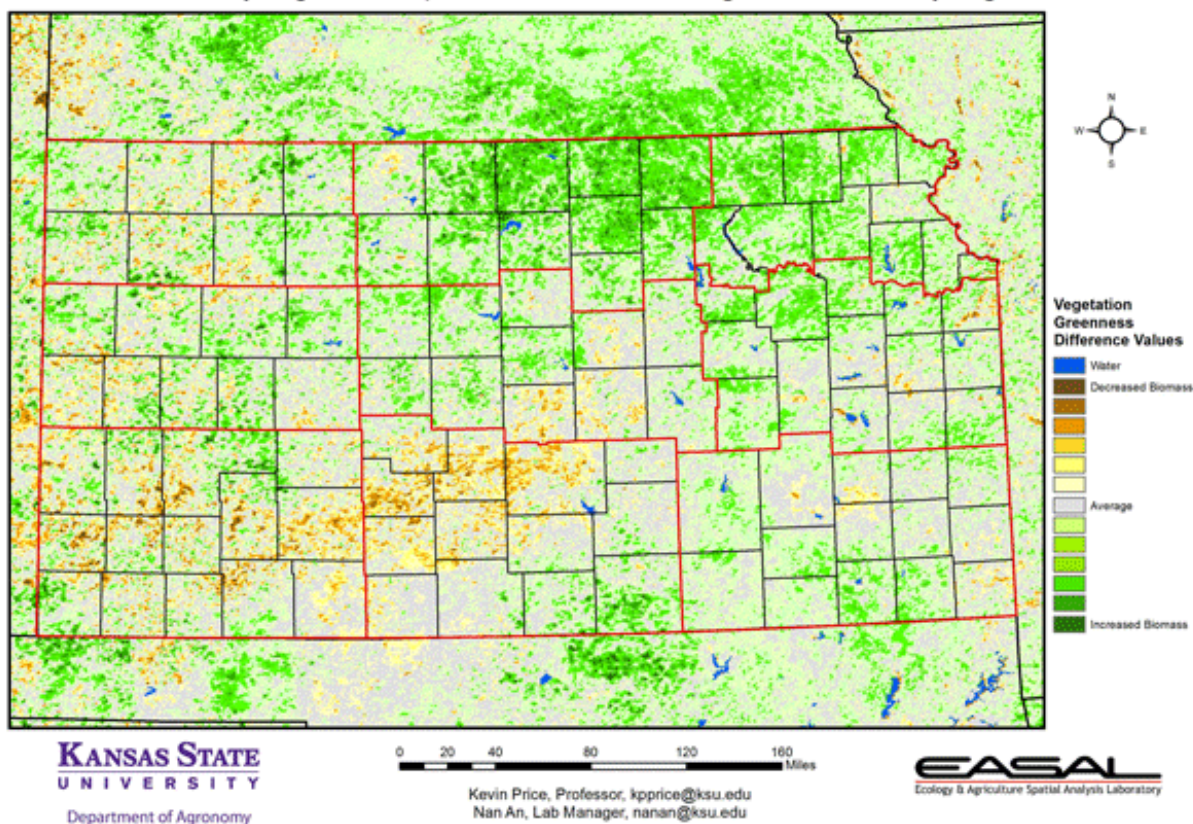


Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for July 21 – August 3 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state has at or above-average photosynthetic activity. The North Central and Northeastern Divisions have the greatest levels of above-average activity. This is partly due to favorable growing conditions and partly due to delayed crop development. This delay means more of the vegetation is in the most active growth period, rather than the reduced activity that comes as the crop matures.

U.S. Corn Belt Vegetation Condition

Period 31: 07/21/2015 - 08/03/2015

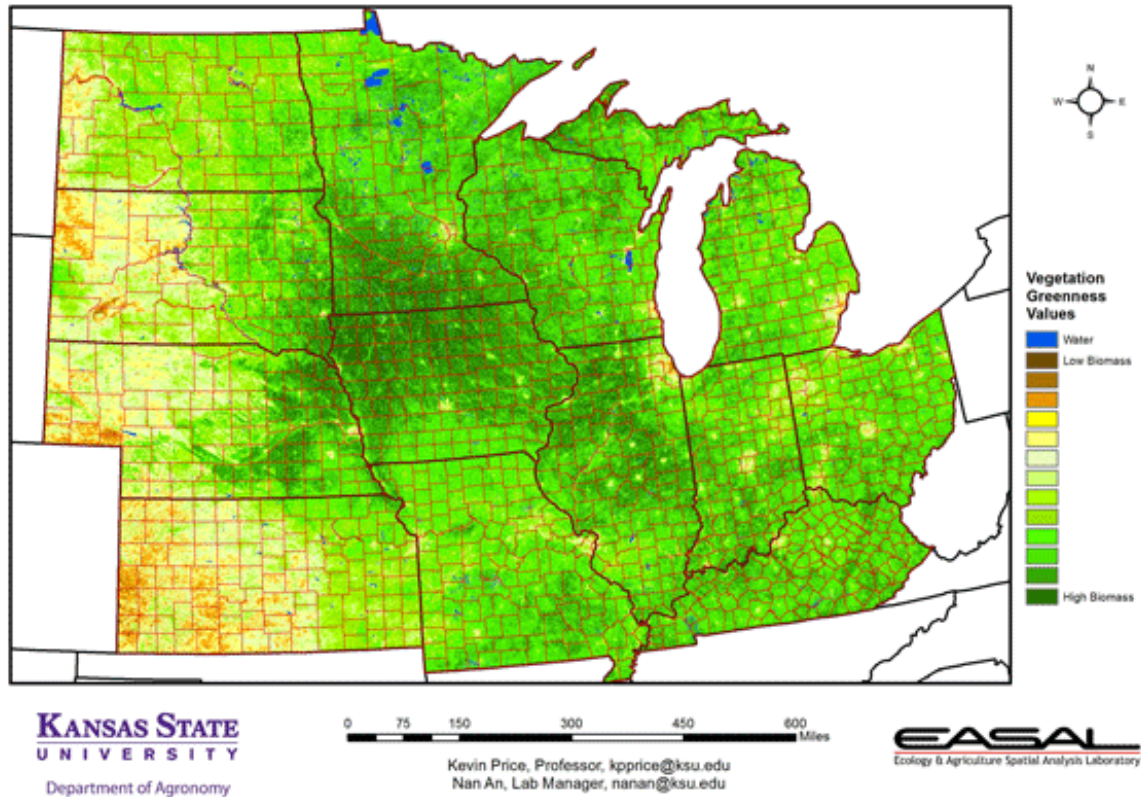


Figure 4. The Vegetation Condition Report for the Corn Belt for July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest photosynthetic activity is concentrated from northeastern Nebraska through Iowa and into Illinois. Favorable moisture conditions have resulted in increased photosynthetic activity. In Iowa, 83 percent of the corn is in good to excellent condition, while 79 percent of the soybeans are in good to excellent condition.

U.S. Corn Belt Vegetation Condition Comparison
Late-Jul/Early-Aug 2015 Compared to Late-Jul/Early-Aug 2014

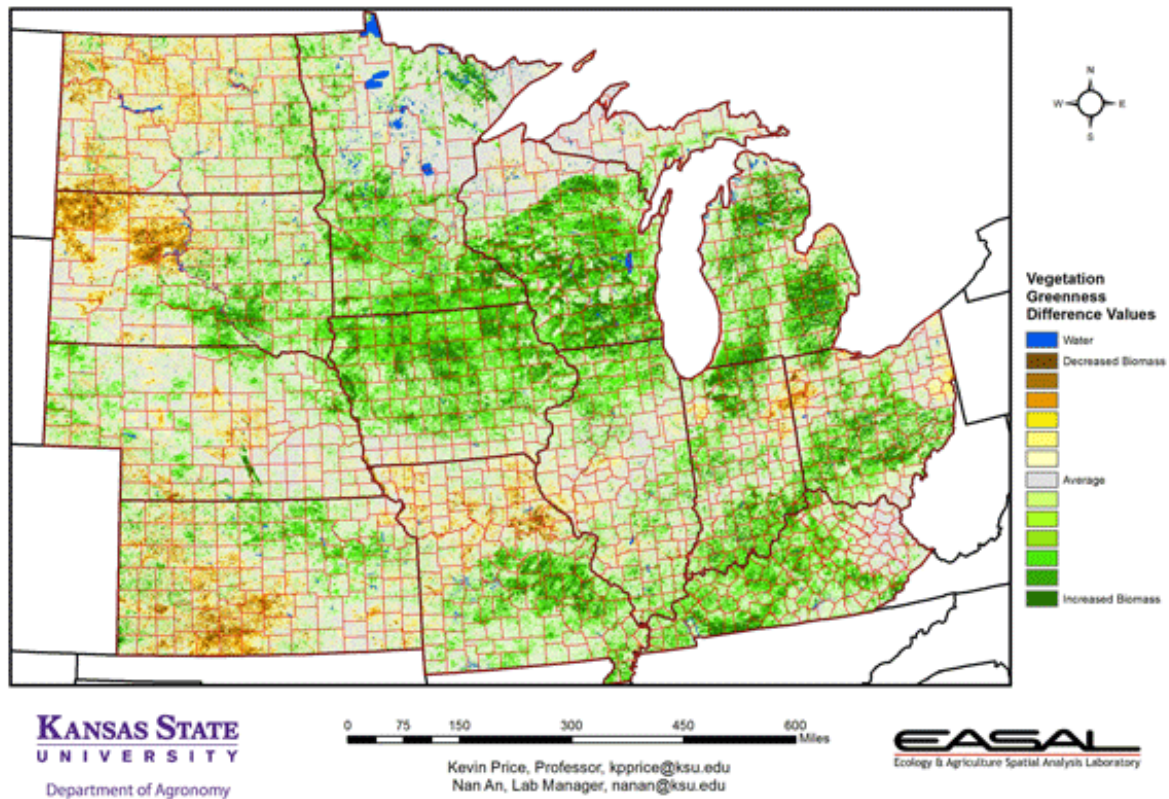


Figure 5. The comparison to last year in the Corn Belt for the period July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows the central portion of the region has much higher photosynthetic activity. This is partly due to a delay in development, with vegetation running later this year in maturity.

Late-Jul/Early-Aug 2015 Compared to the 26-Year Average for Late-Jul/Early-Aug



Continental U.S. Vegetation Condition

Period 31: 07/21/2015 - 08/03/2015

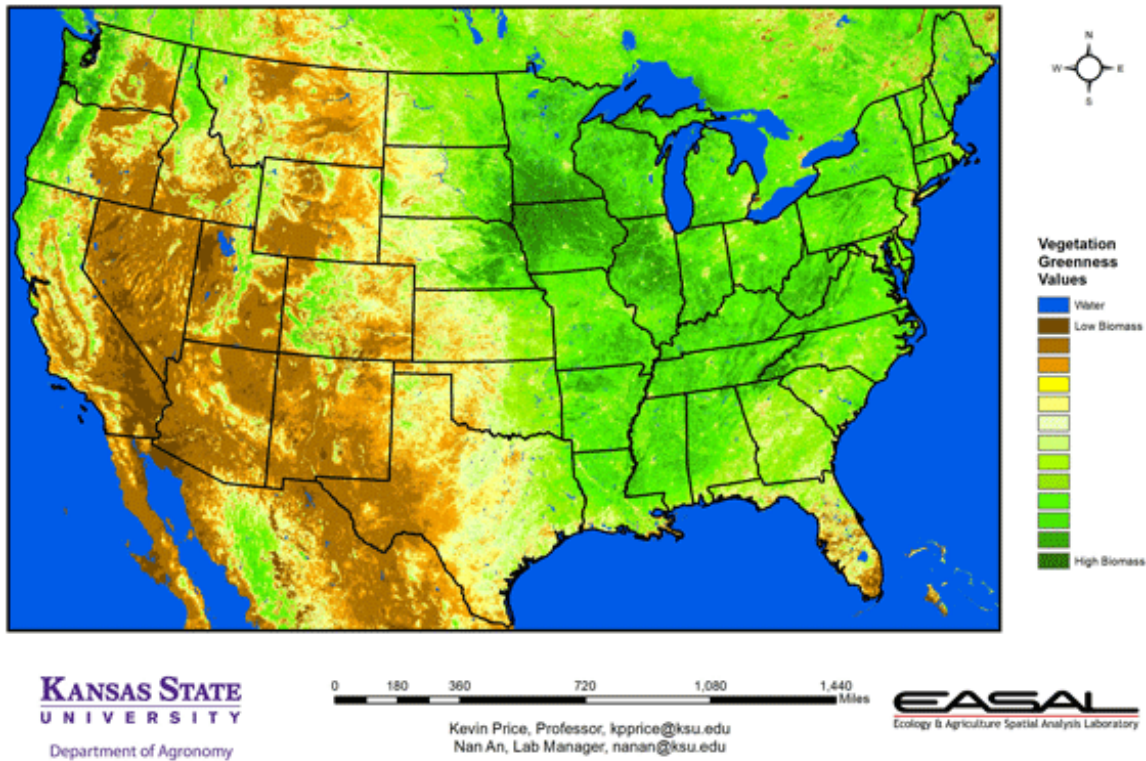


Figure 7. The Vegetation Condition Report for the U.S. for July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the highest level of photosynthetic activity is centered in the Upper Midwest. Lower NDVI values are noticeable in the Southeastern U.S., where drought conditions are beginning to intensify.

Continental U.S. Vegetation Condition Comparison
Late-Jul/Early-Aug 2015 Compared to Late-Jul/Early-Aug 2014

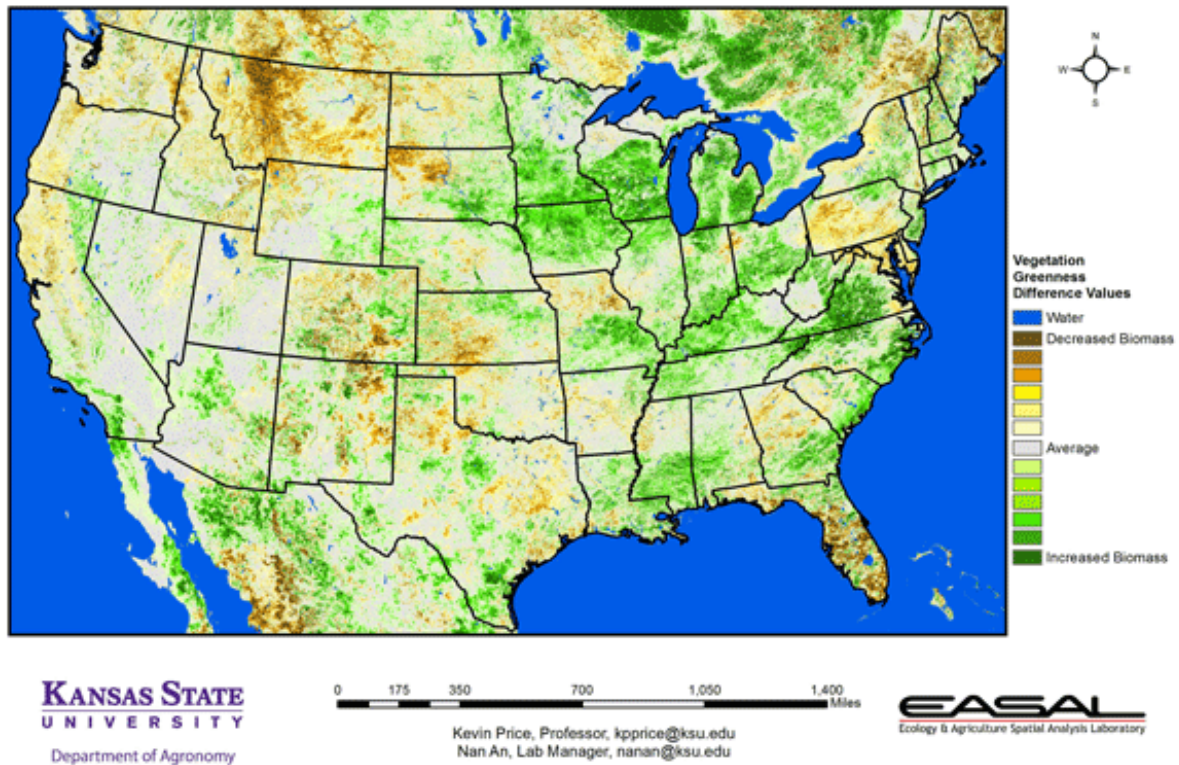


Figure 8. The U.S. comparison to last year at this time for the period July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that lower NDVI values are most evident in Montana. There was a slight reduction in northern California where drought persists. In southern California, there is a slight increase in vegetative activity due to summer rains. This does not mark an end to the intense drought in this region.

Continental U.S. Vegetation Condition Comparison
Late-Jul/Early-Aug 2015 Compared to 26-year Average for Late-Jul/Early-Aug

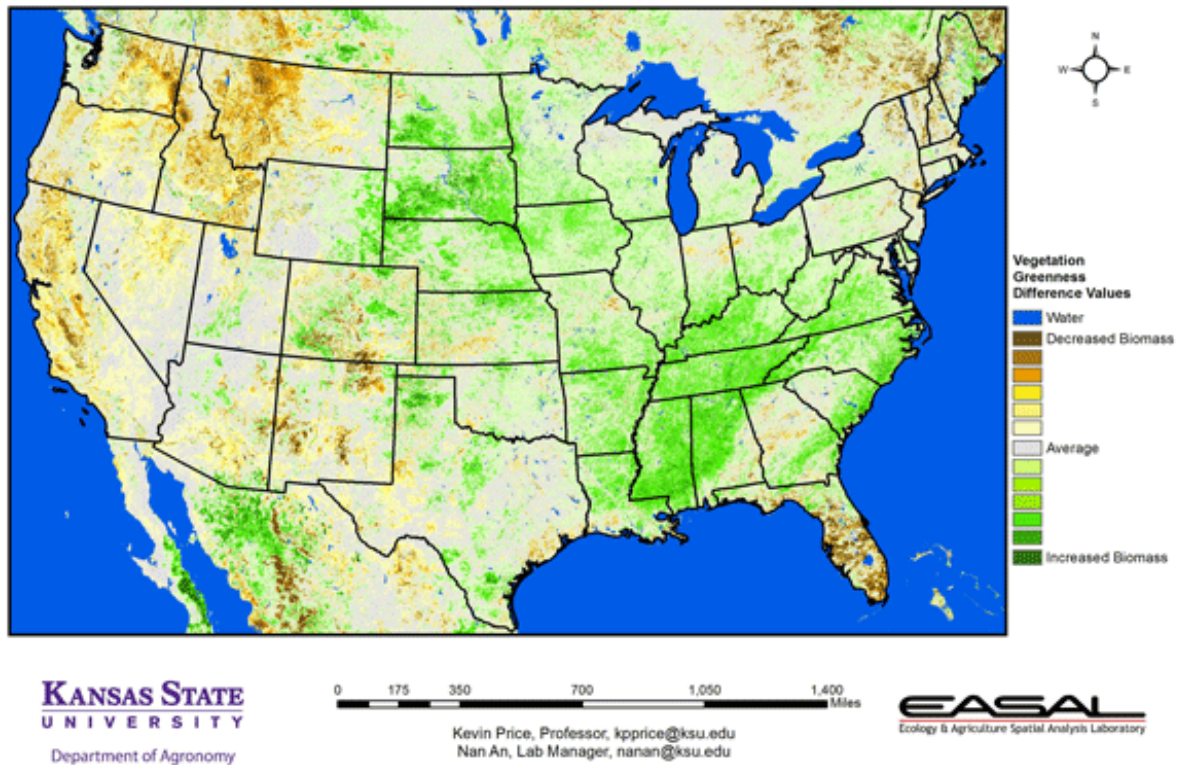


Figure 9. The U.S. comparison to the 26-year average for the period July 21 – August 3 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the West continues to have lower-than-normal photosynthetic activity, while the central and eastern U.S. has generally higher-than-average values. There is a distinct gradient in the southeast, particularly from southern Alabama through South Carolina. This marks an area of expanding drought.

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