



Extension Agronomy

eUpdate

05/30/2014

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. Sorghum management considerations

Sorghum plants can compensate and adjust to diverse environmental conditions through modifications in the number of tillers, head size, and final seed weight. For sorghum, the final number of seeds per head is the plant component that varies the most; and thus has more room for adjustment than the other plant components (seed weight and number of tillers).

Some of the main planting practices affecting yields in sorghum are: row spacing, row arrangement, seeding rate/plant population, planting date, and hybrid maturity.

Seeding Rate/ Plant Populations

Sorghum population recommendations range from a desired stand of 24,000 to 100,000 plants per acre depending on annual rainfall:

Avg. Annual Rainfall (inches)	Seeding rate (x 1,000 seeds/acre)*	Recommended Plant Population (x 1,000 plants/acre)	Within-row Seed Spacing (65% emergence)		
			10-inch rows	20-inch rows	30-inch rows
< 20	30-35	24	16.5	8.5	5.5
20 to 26	54	35	12.0	6.0	4.0
26 to 32	69	45	9.0	4.5	3.0
> 32	108	70	6.0	3.0	2.0
Irrigated	154	100	4.5	2.0	1.5

* Assuming 65% field emergence.

Because of sorghum's ability to respond to the environment, final stands can vary at least 25 percent from the values listed above, depending on expected growing conditions, without significantly affecting yields. Lower seeding rates minimize risk of crop failure in dry environments. Sorghum can compensate for good growing conditions by adding tillers and adjusting head size, but yields can be reduced in a dry year if populations are too high. For a high-yielding environment (>150 bu/acre), under narrow rows high plant populations can be a critical factor for improving sorghum yields. Higher seeding rates also should be implemented when planting late. Increase rates by 20-25 percent if planting in mid-June or later. Late planting will restrict the time that the sorghum plants will have in the growing season for producing productive tillers, decreasing the capability of the plant to compensate for inadequate stands.

Recent research in Kansas has confirmed these long-term recommendations. In these studies, sorghum yields were maximized at 25,000 plants per acre (optimum between 20,000 to 30,000 plants per acre) in western Kansas at 17 inches annual precipitation; 40,000 in central Kansas at 30 inches annual precipitation; and 50,000 in eastern Kansas at 32 inches annual precipitation. Studies in Missouri, with substantially more than 32 inches of annual precipitation, maximized yield with about 60,000 plants per acre. For western Kansas, final stands of about 20,000 to 30,000 plants per acre can attain yields of 60 to 80 bushels per acre or more. For central and eastern Kansas, final stands of 50,000 to 70,000 plants per acre can maximize yields, with the final objective of having 1 to 1.5 heads per plant.

Having more than the recommended number of plants per acre results in fewer fertile and productive tillers and thinner stems, which will reduce yield in the drier environments and increase susceptibility to drought. On the other extreme, thin stands can compensate for better-than-expected growing conditions somewhat by producing more and/or larger heads. But under high-yielding environments a higher final plant population will be needed to increase yields as much as possible (Table 1).

Planting date

A summary of research information performed in the last several years has confirmed that the optimum planting date for maximizing yields will be around early June (Figure 1). Still, the decision related to the optimum planting date is more complex and should be timed so plants can enter the flowering stage while avoiding hot and dry weather, but can still have sufficient time to mature before the first frost.

Planting date has some effect on seeding rates. Sorghum tillers more readily in cool temperatures and less readily under warm conditions. As a result, later plantings in warmer weather should be on the high side of the recommended range of seeding rates for each environment since there will be less tillering. The potential for greater tillering with earlier planting dates makes sorghum yields generally more stable when planted in May and early June compared to late June or July plantings.

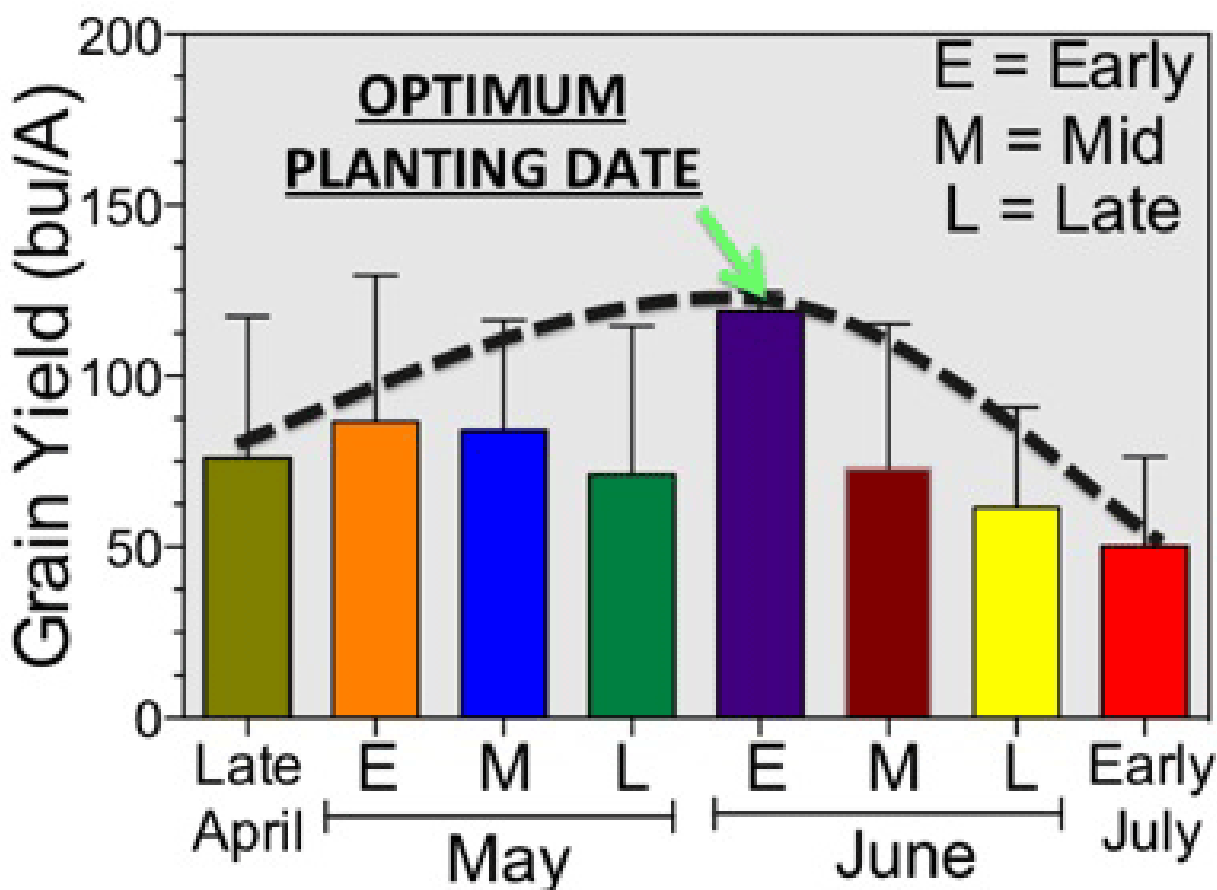


Figure 1. Planting date effect on final sorghum yields (Tribune/ Hutchinson/ Manhattan, Vanderlip; Scandia 1994-96, Gordon; St. John 1993-95, Martin and Vanderlip; Columbus

Row spacing

The other factor that can influence yield is row spacing. The last three columns in Table 1 show that plant spacing within the row becomes greater as row spacing decreases. This greater intra-row plant spacing reduces plant-plant competition early in the growing season when head number and head size are being determined.

A response to narrow row spacing is expected under superior growing environments, when water is a non-limiting factor. Narrow rows increase early light interception, provide faster canopy closure, reduce evaporation losses, can improve suppression of late-emerging weeds (a major issue in sorghum), and maximize yields.

The influence of row spacing on sorghum yield has not been entirely consistent in K-State tests. In a summary of experiments conducted in Kansas, the comparison between wide (30-inch) vs. narrow (15-inch) row spacing shows a close relationship, with an overall yield benefit in using narrow rows of 4 bushels per acre. In addition, narrow rows outyielded wide rows in 71 percent of all observations evaluated.

A more consistent response to narrow rows was documented when yields were above 70 bushels per acre, increasing the likelihood of capturing higher yields when narrow spacing was employed. In summary, the potential for a positive yield response to narrow rows is greatest in high-yielding environments, but the response is not always consistent. Under low yielding environments, conventional (30-inch) wide row spacing is the best alternative.

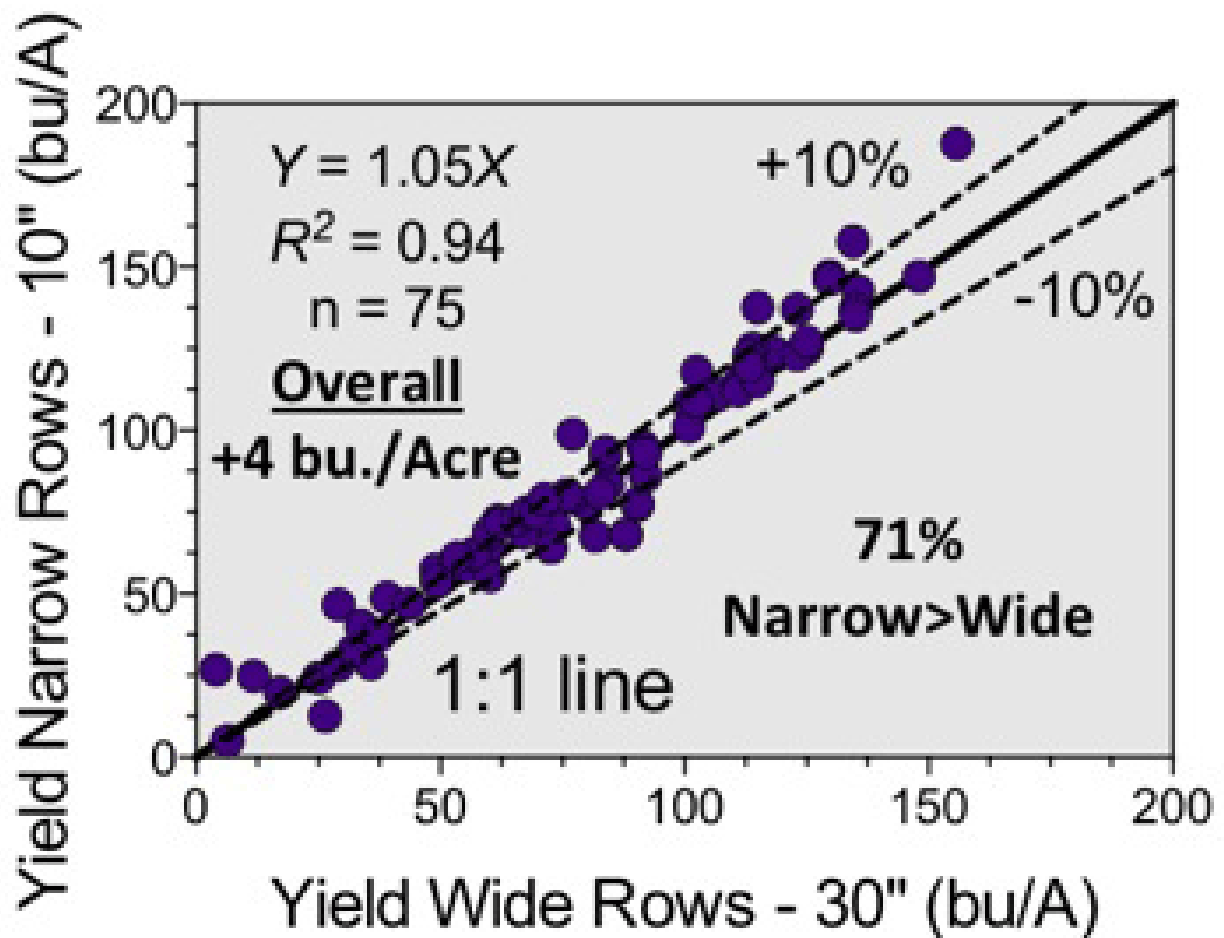


Figure 2. Yield in narrow rows versus yield in wide rows. From a total number of 75 observations, 71% had a greater yield in narrow as compared to wide row spacing.

Should populations be adjusted with narrow rows? Research results indicate that the population producing the greatest yield doesn't change with different row spacings, but the magnitude of response to population potentially can be greater with narrower row spacings in high-yielding environments.

Planting date seems to have an interaction with row spacing. Over three years at the North Central Experiment Field, there was essentially no difference in yield between 15- and 30-inch rows for late-May plantings, but there was a 10-bushel yield advantage for 15-inch rows for late June plantings. A similar response was observed at Manhattan in 2009 when no difference in row spacing was observed for the May planting, but 10-inch rows had an 11-bushel/acre yield advantage over 30-inch rows with the June planting. The opposite response was seen at Hutchinson in 2009 where narrow rows had a 6 bushel/acre yield advantage with a May planting date, but wide rows had a 6 bushel/acre yield advantage with a June planting date. In all cases, yields were less with the June planting, but the June plantings at Belleville and Manhattan averaged more than 115 bushels/acre, while yields at Hutchinson were less than 92 bushels/acre.

Hybrid Selection

The selection of sorghum hybrids should be based not only on maturity, but also in other traits such

as resistance to pests, stalk strength, head exertion, seeding vigor, and overall performance. The selection of a sorghum hybrid based on its maturity should be strictly related to the potential planting date, expected duration of the growing season, and the probability the hybrid will mature before the first freeze event. Shorter-season hybrids might be a better fit for late planting dates (mid-June to July depending on the regions); while a longer-season hybrid is recommended when planting time is early and the duration of the growing season is maximized.

For the summary of planting date information in Figure 1, hybrid maturity showed a very complex pattern across the diverse locations. Overall, longer-season hybrids showed a better yield at the mid-May planting time, but yields were less than 100 bushels per acre. For medium and short-season hybrids, the early June planting date produced yields of more than 100 bushels per acre. The goal is to plant a hybrid maturity at each particular site/environment (weather and soil type) so the plants can bloom in favorable conditions, and have adequate grain fill duration before the first fall freeze occurs.

Summary

- Determine your desired population based on average rainfall and expected growing conditions. There is no need to go overboard.
- Make sure you plant enough seed for your desired plant population. About 65-70 percent field germination is a good general rule to use.
- Think about using narrower row spacings to close the canopy sooner and potentially capture greater yields in yield environments of 70 bushels per acre or more.
- Planting data and hybrid selection are tied together, and are related to the conditions experienced by sorghum plants during the late summer. Think about this before deciding your planting time and selecting a hybrid.

For more information related to sorghum production and management, check the following link to the 2014 K-State Sorghum School presentations and related documents:

<http://www.agronomy.k-state.edu/extension/crop-production/grain-sorghum/sorghum-school/2014-sorghum-school/index.html>

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2. *Sericea lespedeza* control in rangeland, pasture, and CRP

June is on the horizon and early summer is a good time to consider spraying *sericea lespedeza*.

Plants are in a vegetative growth stage and previous research has indicated good to excellent control at this time.



Figure 1. Vegetative growth stage of *sericea lespedeza*. Photo by Walt Fick, K-State Research and Extension.

Sericea lespedeza continues to be a major concern on rangeland, pasture, and some CRP acres in Kansas. It is a statewide noxious weed in Kansas and therefore needs to be controlled. *Sericea lespedeza* has a tremendous seed bank that helps reestablish stands.

There are no known biological controls that can be effectively used on *sericea lespedeza*. However, grazing with goats can suppress *sericea lespedeza* stands and produce a saleable product. It takes 4 to 5 goats per acre (of *sericea*) to graze the plant heavily enough to eliminate seed production. Cattle supplemented with corn steep liquor (CSL) have been shown to consume more *sericea lespedeza* than animals not supplemented with CSL. Current studies are underway to determine the impact of late summer grazing by sheep on *sericea lespedeza*.

Frequent mowing will reduce sericea lespedeza, but is also damaging to plants that might be growing/competing with sericea. A single mowing in mid- to late-July will eventually reduce stands of sericea lespedeza to some extent. Sericea has not been eliminated, however, even after several years of mowing. A late-summer mowing will eliminate most seed production. Application of appropriate herbicides about 4-6 weeks after mowing will help reduce sericea lespedeza stands.

Herbicides applied at the correct time and under favorable environmental conditions can significantly reduce sericea lespedeza.

Remedy Ultra (triclopyr) and PastureGard HL (triclopyr + fluroxypyr) can provide effective control when applied during June and into early July when the sericea plants are in a vegetative growth stage. Broadcast applications of Remedy Ultra at 1 to 1.5 pints/acre and PastureGard HL at 0.75 to 1.5 pints/acre should be applied in spray volumes of 10 to 20 gallons/acre.

Products containing metsulfuron, such as Escort XP, Cimarron Plus, and Chaparral are generally more effective in the late summer when sericea lespedeza is actively blooming. Recommended rates are 0.5 oz/acre of Escort XP, 0.625 oz/acre Cimarron Plus, and 2.5 to 3 oz/acre Chaparral. Use a non-ionic surfactant with all of these products.

For spot applications, mix 0.5fl oz PastureGard HL per gallon of water, use a 1 percent solution of Remedy Ultra in water, or 0.3 grams Escort XP per gallon of water. Aerial applications of these products should be done with a minimum spray volume of 3 gallons per acre. Higher volumes, e.g. 5 gallons per acre, will generally be more effective.

Herbicide treatments will need to be repeated every 2 to 4 years to keep this invasive species in check. Initial treatments should reduce dense stands to the point where spot treatment can be used in future years. Left untreated, sericea lespedeza will dominate a site, greatly reducing forage production and species diversity. Be persistent with control efforts to keep this invasive species at manageable populations.

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3. Wheat tour scheduled at North Central Experiment Field, June 4

The North Central Experiment Field Wheat Plot Tour is scheduled for Wednesday, June 4, starting at 7:30 a.m. The morning also features information about growing canola in north central Kansas.

The field is located about two miles west of Belleville on Kansas Highway 36. Juice and rolls will be served ahead of the tour. Tour topics include:

- Wheat Varieties and Diseases
- Canola Variety Selection for North Central Kansas.

The tour is free and open to the public. More information is available by calling the North Central Experiment Field at 785-335-2836 or contacting Dallas Peterson at 785-532-0405 or depterso@ksu.edu.

4. Comparative Vegetation Condition Report: May 13 - 26

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 25-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, service climatologist:

Kansas Vegetation Condition

Period 21: 05/13/2014 - 05/26/2014

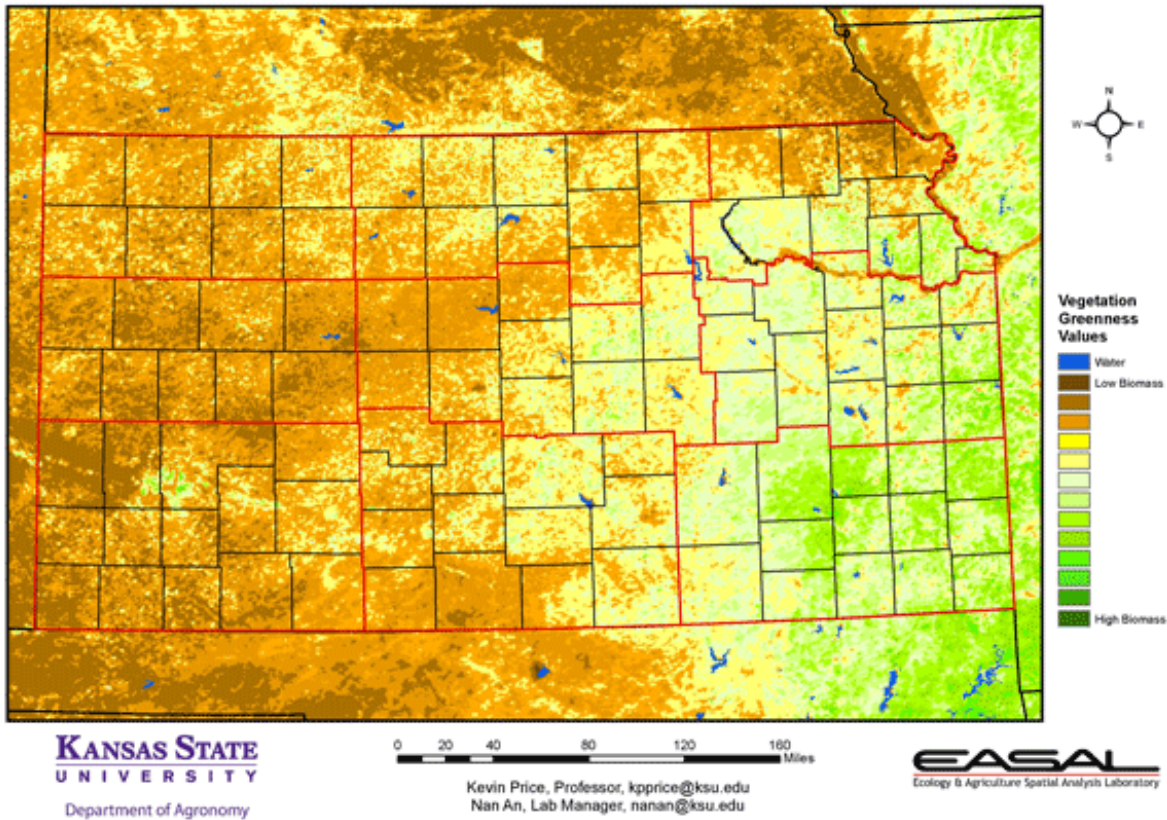


Figure 1. The Vegetation Condition Report for Kansas for May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the most active biomass production is confined to the eastern part of the state. There is also a small area of active biomass production in southwestern Finney County, where irrigated alfalfa is prevalent.

Kansas Vegetation Condition Comparison

Mid-May 2014 compared to the Mid-May 2013

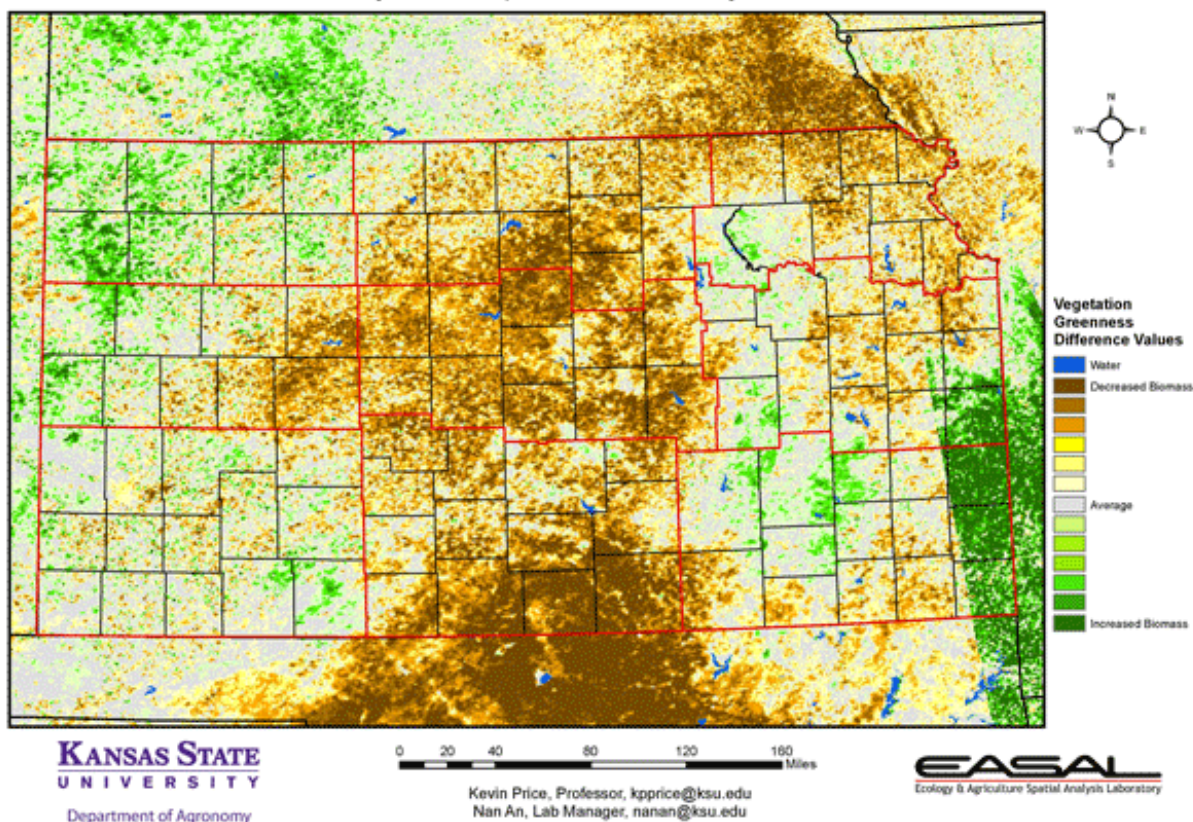


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows a very distinct splice line in southeast Kansas, due to cloud contamination. The most notable feature is the much lower NDVI values in the central third of the state. The biggest decrease is visible in south central Kansas, where wheat conditions are much less favorable than last year. Statewide, wheat conditions were reported to be 61 % poor to very poor this year.

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Kansas Vegetation Condition Comparison
Mid-May 2014 compared to the 25-Year Average for Mid-May

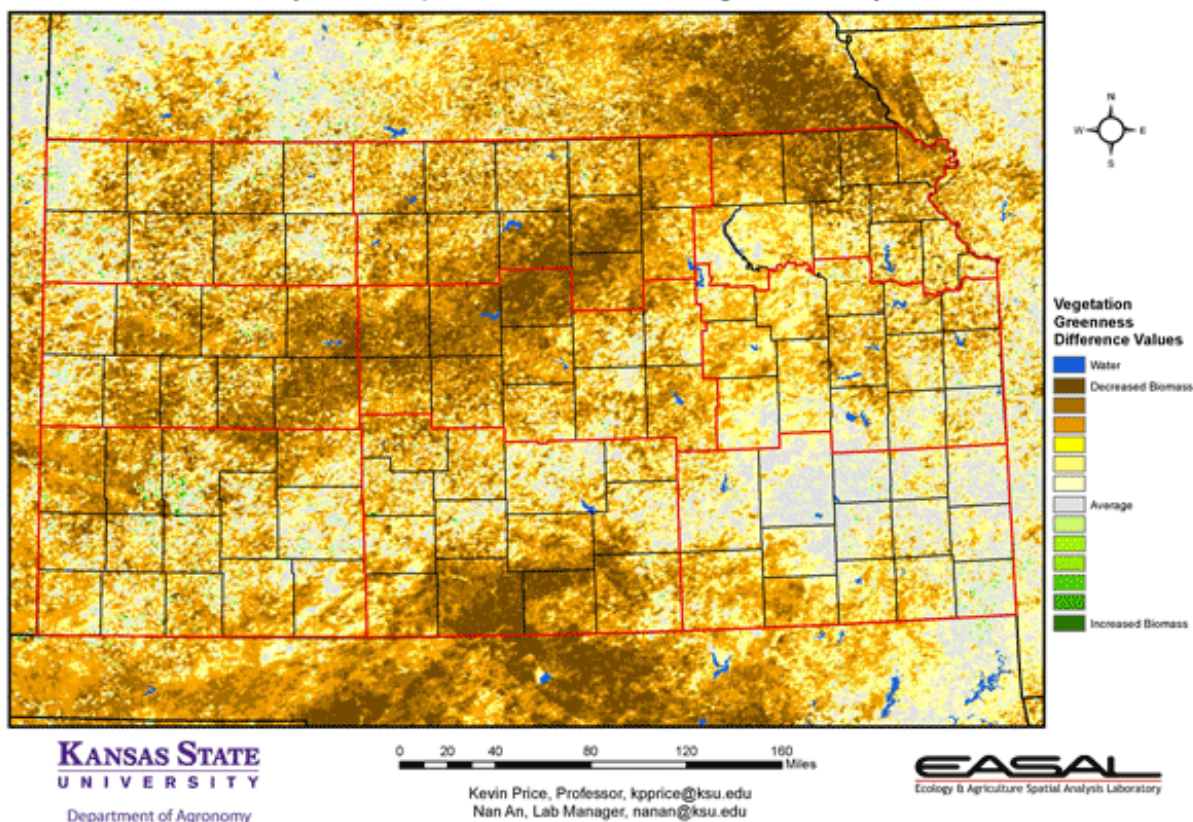


Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for May 13 – 26 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the entire state has below-average biomass production. Central and South Central Divisions are showing the greatest decrease in photosynthetic activity. This is a result of the cooler-than-average temperatures for the spring to date, coupled with a late freeze (May 13th), and drought conditions.

U.S. Corn Belt Vegetation Condition

Period 21: 05/13/2014 - 05/26/2014

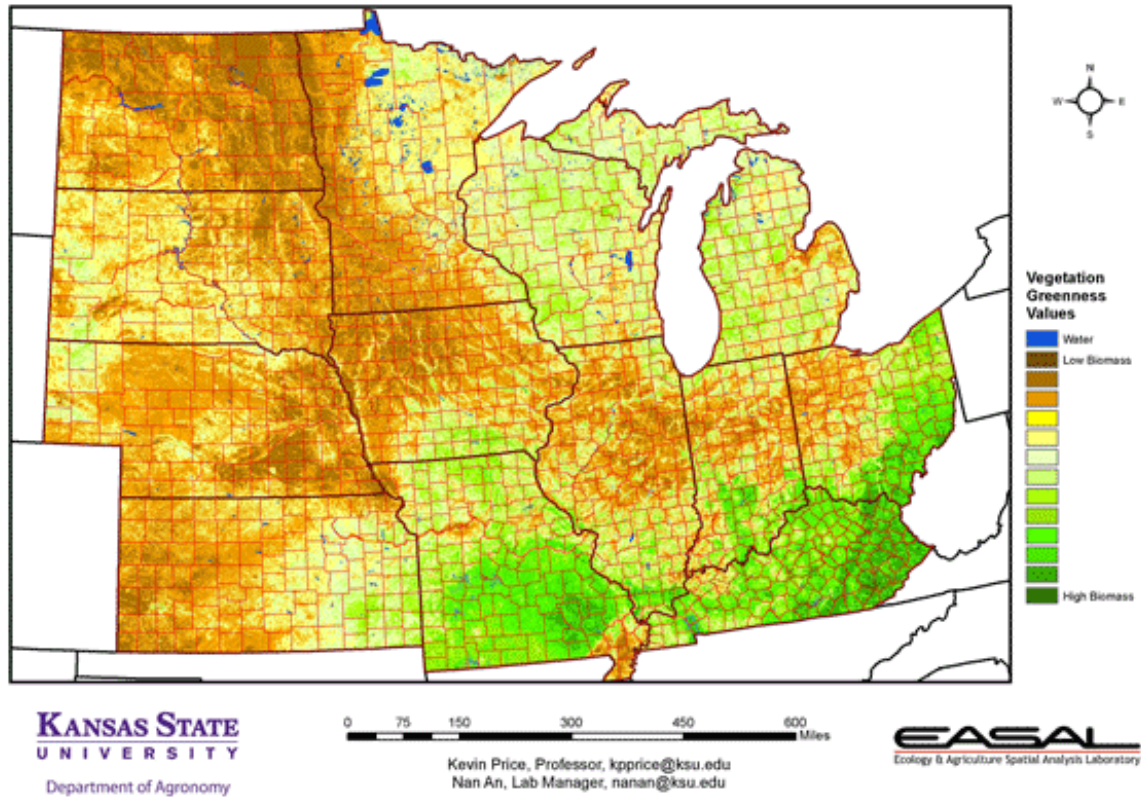


Figure 4. The Vegetation Condition Report for the Corn Belt for May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the southern portions of the region have the highest NDVI values. Favorable temperatures and moisture in those areas have allowed for active biomass production. To the north, continued cold temperatures have delayed planting and delayed biomass production.

U.S. Corn Belt Vegetation Condition Comparison
Mid-May 2014 Compared to Mid-May 2013

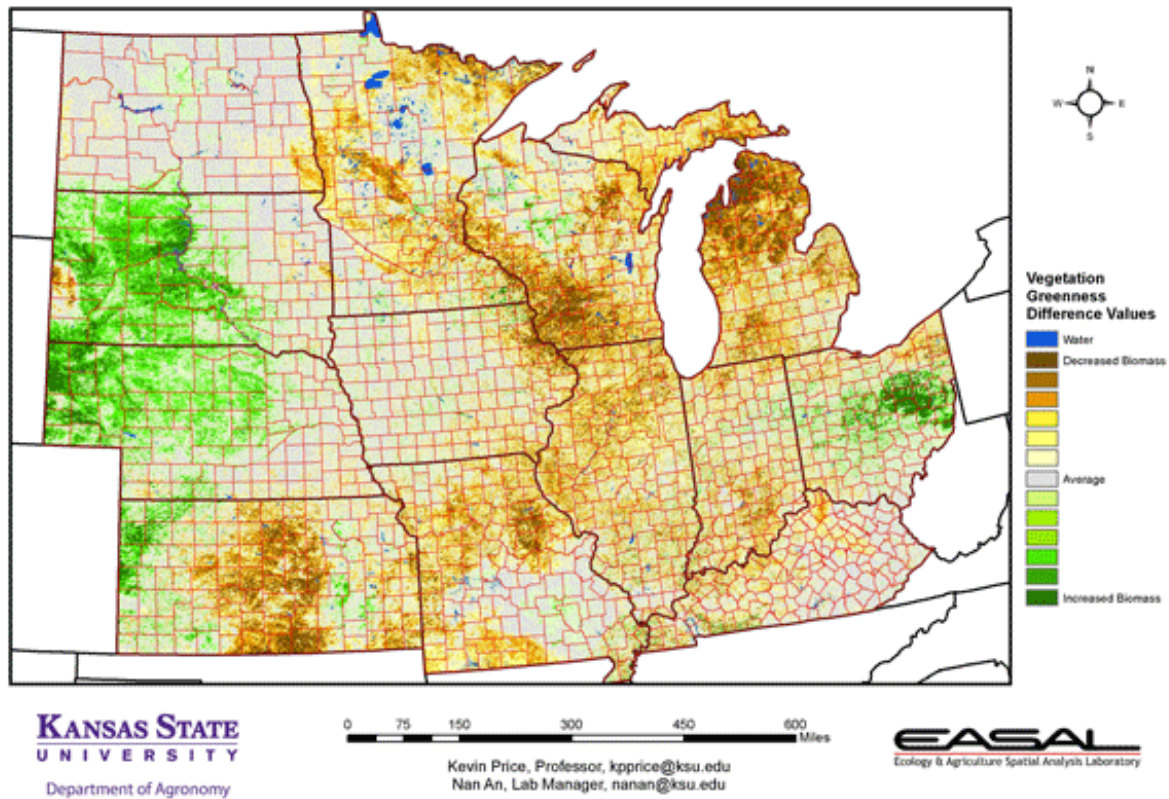


Figure 5. The comparison to last year in the Corn Belt for the period May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows the largest area of increased productivity is in western South Dakota and the Nebraska Panhandle. Favorable moisture has increased vegetative activity in these regions. These areas are drought-free, and unlike North Dakota have had more typical temperatures.

U.S. Corn Belt Vegetation Condition Comparison
Mid-May 2014 Compared to the 25-Year Average for Mid-May

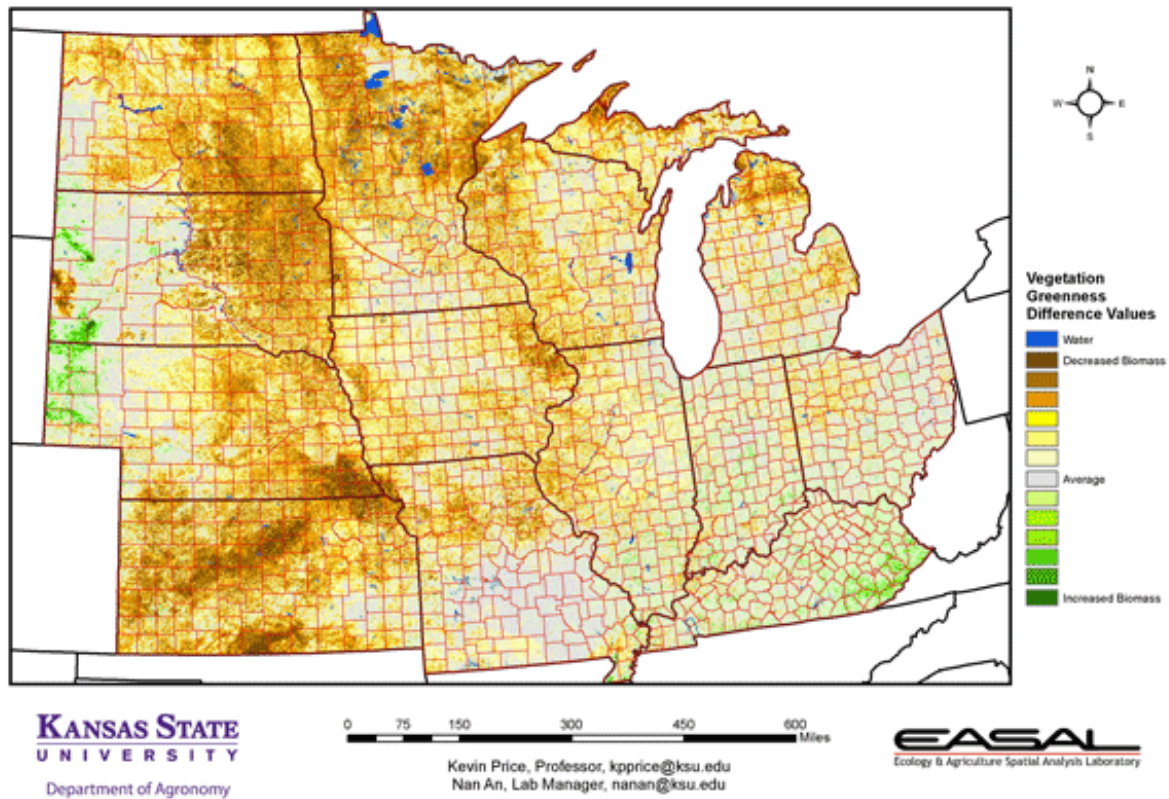


Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for May 13 – 26 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that below-average vegetative activity is most noticeable in the central portion of the region. Cold temperatures have delayed activity to the north, while drought has reduced production to the south.

Continental U.S. Vegetation Condition

Period 21: 05/13/2014 - 05/26/2014

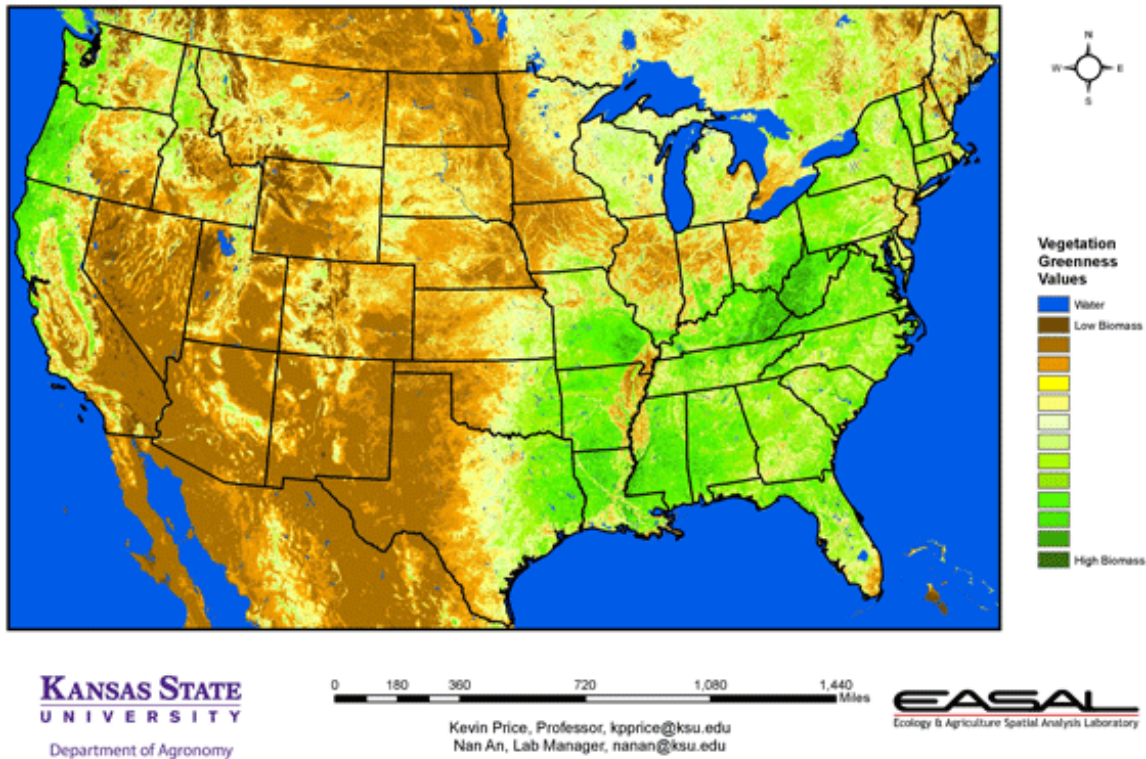


Figure 7. The Vegetation Condition Report for the U.S. for May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that West Virginia and eastern Kentucky have the greatest NDVI values. In the central Ohio River Valley and along the central Mississippi Basin, excessive soil moisture has delayed activity. The area of high biomass production in Northern California continues to decrease.

Continental U.S. Vegetation Condition Comparison
Mid-May 2014 Compared to Mid-May 2013

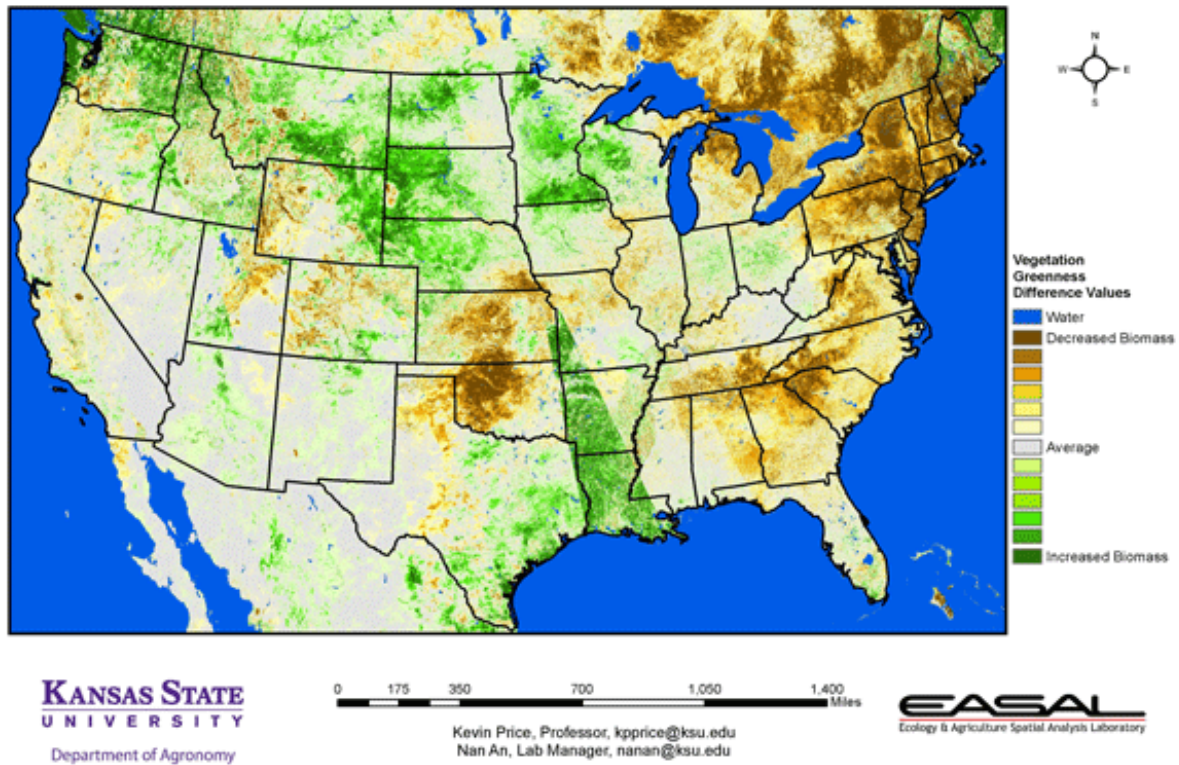


Figure 8. The U.S. comparison to last year at this time for the period May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the Northern Plains has higher NDVI values, due mainly to more favorable moisture conditions. By contrast, the Northeast has lower biomass production, due to the persistent cold weather. In southern Kansas and central Oklahoma, the decrease is due to drought. The triangle of increased NDVI values from southwestern Missouri through Louisiana is an artifact of cloud contamination.

Continental U.S. Vegetation Condition Comparison
Mid-May 2014 Compared to 25-year Average for Mid-May

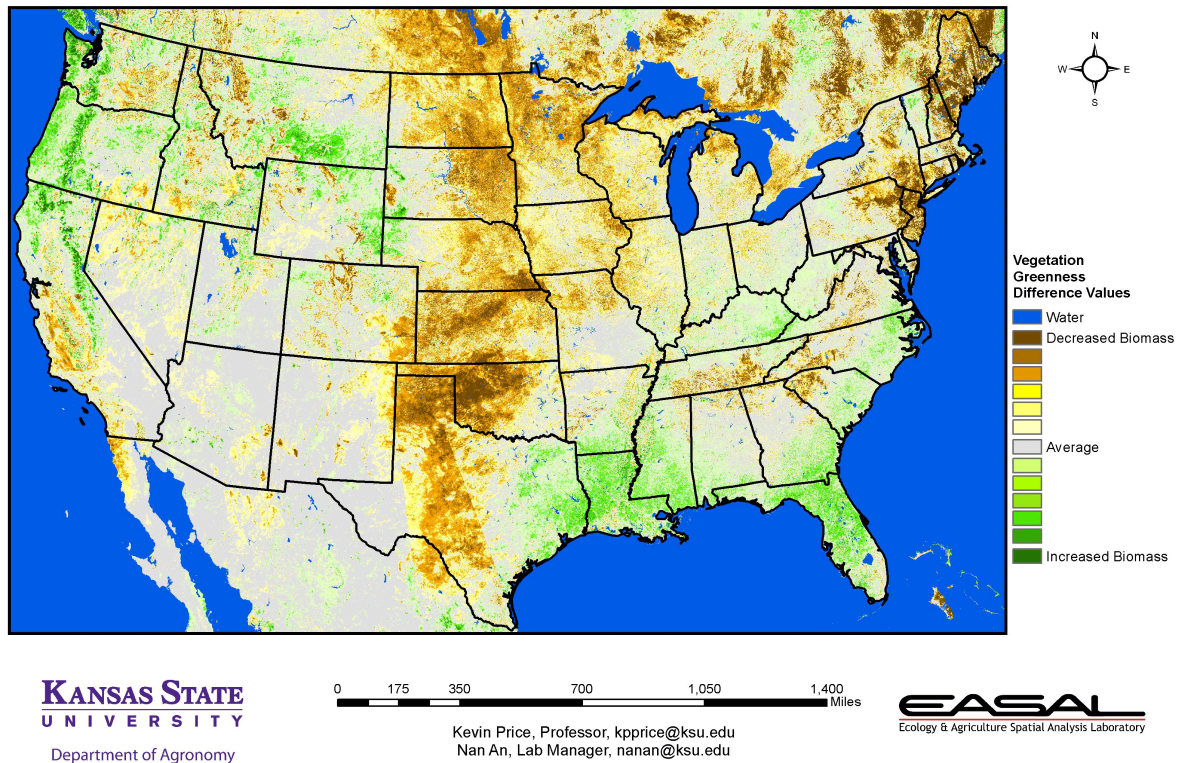


Figure 9. The U.S. comparison to the 25-year average for the period May 13 – 26 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the central U.S. has the greatest level of below-average biomass activity. From central Nebraska to central Texas the major cause is drought. To the north, the major culprit is continued colder-than-normal temperatures.

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