Issue 455

K-STATE Research and Extension

Extension Agronomy

eUpdate

05/09/2014

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. Can a late nitrogen topdressing help wheat yields this year?

With the wheat being unusually late and small this year, and still pale or yellowish in some cases, producers may be wondering whether they would still get any benefit from topdressing with nitrogen (N) at this point in the season.

Reasons for pale, yellowish wheat at this point in the year

If a topdressing application of N had been made earlier and the wheat is still short and pale, the cause is most likely because: (1) root development is poor due to dry conditions, limiting total nutrient uptake, (2) the applied N hasn't yet been moved into the soil by precipitation, (3) only a small portion of the N in the soil has been moved to the surface of the plant roots (which have been stunted by the dry conditions) with water via mass flow, the primary N uptake process, (4) the N has been tied up by surface residue or lost due to volatilization, or (5) another nutrient, such as sulfur, may be limiting.

With a rain, most of these issues may be resolved. In many of these dry soils, the breakdown of crop residues and organic matter will kick into high gear once it rains, releasing N and S. Root growth will also kick into high gear and expand the exploited zone of soil. As the water begins to flow towards the roots, mobile nutrients like nitrate and sulfate dissolved in that soil water and will flow to the plant roots for uptake. But if the crop wasn't topdressed, and soil N supplies are deficient, or if a rain does not look likely, producers may wonder if an application of N or S now would help the yield potential of pale or yellowish N-deficient wheat.

When yield components of wheat are determined

Keep in mind some of the basics of wheat physiology and yield when considering late fertilization. There are three primary components of yield: the number of heads per foot of row; the size of the head or number of kernels per head; and the size of the individual kernels. Number of heads is a function of the initial plant stand, tillering, and tiller survival.

In many Kansas fields initial stands were spotty, but tillering was adequate. As the dry spring progressed, tillers began to abort due to drought stress. Head size is determined around Feekes 5, prior to first hollow stem. The plant responds to environmental conditions and produces a head of the size that it can successfully fill under existing conditions. If conditions are bad, which was the case in many fields, small heads are formed, and the plant sheds tillers through tiller abortion, further reducing total potential kernel numbers. So by jointing and stem elongation, the maximum number of kernels which can be produced is already set.

The final yield component, kernel size, is yet to be determined at this point in the season. Weather conditions at heading and pollination will impact the number of actual kernels set per head, and rain during grain fill will produce big plump kernels. While kernel size is very important and will determine the number of kernels actually set which can be harvested and marketed, maximum kernel size is set genetically.

Unfortunately we can't produce a wheat kernel the size of an apple. So while correcting an N or S deficiency now, as the crop is approaching or at heading, can have some potential to preserve potential yield or increase yield by maximizing the size and number of potential kernels harvested, the extent of that response is limited since the maximum number of heads and kernels per head was

determined several weeks ago.

Leaf burn considerations

The potential for leaf burn is an important consideration with late applications of N. Traditional broadcast applications of 28% liquid N with flood or flat fan nozzles can cause foliar burn to the flag leaf, especially at high air temperatures. Leaf burn is a serious concern when it occurs on the upper leaves, since the wheat relies on these leaves for grain fill**.**

Once the head begins to emerge, the risk of injury from leaf burn from broadcast UAN far exceeds any potential response to additional fertilizer, even if the wheat is N deficient. At that stage of growth, a foliar N product is much safer to the crop.

To reduce the potential for leaf burn, there are alternative ways to apply traditional liquid N sources other than the standard spray nozzle. Streamer bars, a 10- to 15-inch long plastic bar which can be used with traditional spray booms in place of the nozzle, provide a solid stream of liquid fertilizer spaced every 5-6 inches. These streams of liquid greatly reduce foliar burn as compared to complete foliage coverage with standard flat fan spray nozzle. Broadcast granular urea also produces limited leaf burn as compared to sprayed UAN.

Foliar nitrogen products

Various foliar nitrogen (N) fertilizer products are available. These products range in analysis and can include straight nitrogen products or mixtures of N plus other macro and micro nutrients. The straight nitrogen products will typically have an analysis similar to traditional liquid N fertilizers, such as 25 to 30 percent N.

One of the main differences between traditional UAN and the foliar products is that a certain percentage of the N in the foliar fertilizers is commonly in some type of slow-release form. As a result, these specialty products are generally safer for application directly to the foliage in later stages of growth and result in less leaf burn than traditional UAN products.

K-State has tested many different types of foliar N fertilizer products over the years. Foliar N fertilizer products are just as effective as traditional N fertilizers on a pound-for-pound basis, but they *are not more effective* than traditional N fertilizers. They can be applied in a broadcast spray application at later growth stages of wheat growth than traditional N fertilizer products without damaging the wheat.

One of the reasons the foliar products have not been found to be more effective than traditional soil application is that only a small portion of the N applied as a foliar application to wheat actually moves into the plant through the leaf tissue. An excellent study done in Canada a few years ago found that when care was taken to prevent foliar applied N from reaching the soil, only 8-12% of the applied N was recovered by the plant, compared to 35 to 70% of soil applied N being taken up by the plant. Thus it is very likely that many foliar applied fertilizers are actually taken up through the roots once they wash off the plant.

Invariably, the foliar products will be higher in terms of cost-per-pound-of-N than the traditional N fertilizers. In unusual situations (well after jointing or when trying to increase protein levels), the foliar N products would have some premium value since traditional N products could not safely be used in

a broadcast spray application.

The bottom line

The bottom line is, there are limited opportunities to increase wheat yields in most fields this late from N applications.

The last opportunity for improving yield is maximizing grain fill with larger berries. However, current research by K-State has shown that flag leaf emergence is the last growth stage that has marginal reliability for getting yield and protein responses to N applications in Kansas.

Foliar N products can be used for later applications, but the limited amounts of N which can be applied based on the labels of many of these foliar products limits their use in situations where large amounts of N are needed, and the potential for yield increase is limited physiologically.

The potential for yield response to an N application at this point in the season is very low. Additional N applications now will likely result in reduced profit per acre.

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2. Large-scale dryland cropping systems research at Tribune

A large-scale rainfed cropping systems research and demonstration project has been underway since 2008 at the Southwest Research-Extension Center station in Tribune to evaluate several alternative systems that are more intensive than two- or three-year rotations. We are testing two summer crops (corn and grain sorghum) along with winter wheat in crop rotations varying in length from 1 to 4 years.

The crop rotations in the test are:

- Continuous grain sorghum
- Wheat-fallow, wheat-corn-fallow
- Wheat-sorghum-fallow
- Wheat-corn-sorghum-fallow
- Wheat-sorghum-corn-fallow

The objective of the study is to identify cropping systems that enhance and stabilize production in rainfed cropping systems to optimize economic crop production. Averaged across the past six years, wheat yields tended to be less in four-year rotations than in two- and three-year rotations. Corn and grain sorghum yields (six-year average) were about twice as great when following wheat than when following corn or grain sorghum.

The objectives of the study are to (1) enhance and stabilize production of rainfed cropping systems through the use of multiple crops and rotations using best management practices to optimize capture and utilization of precipitation for economic crop production, and (2) enhance adoption of alternative rainfed cropping systems that provide optimal profitability.

Procedures

The crop rotations are two-year (wheat-fallow), two three-year (wheat-grain sorghum-fallow and wheat-corn-fallow), and two four-year rotations (wheat-corn-sorghum-fallow and wheat-sorghum-corn-fallow), and continuous sorghum. All rotations are grown using no-till practices except for wheat fallow, which is grown using reduced-tillage. All phases of each rotation are present each year. Plot size is a minimum of 100 × 450 ft. In most instances, grain yields were determined by harvesting the center 60 feet (by entire length) of each plot with a commercial combine.

Results and Discussion

Wheat yields averaged across the past six years (2008–2013) tended to be slightly greater in two- and three-year rotations than in four-year rotations. Corn yields following wheat averaged about twice as much as when following sorghum. Similarly sorghum yields following wheat were about twice as much as when following corn or sorghum.

Grain yield response to crop rotation in large-scale dryland cropping systems study at Tribune: 2008-2013			
	Wheat	Corn	Sorghum
Crop rotation	Yield (bu/acre)		
Wheat-fallow	24	--	--
Wheat-corn-fallow	24	37	--
Wheat-sorghum-fallow	25	--	66
Wheat-corn-sorghum-fallow	20	38	34
Wheat-sorghum-corn-fallow	21	20	63
Sorghum-sorghum	--	--	32
LSD 0.05	4	5	9

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3. Wheat disease update

The wheat crop has raced ahead in growth stages this past week. The growth stage now ranges from flag leaf emergence in the north to early stages of kernel development in the south.. The hot, dry weather continues to be the major issue in the state although spotty rains have brought some short-term relief to some limited areas of the state.

I have been scouting and participating in Extension programs in south central Kansas this week including Barber, Harper, Kingman, Pratt, and Reno counties. I found no leaf rust or stripe rust in these demonstration plots. Powdery mildew has been absent this year. I found trace levels of tan spot in a few fields on lower leaves. Other reports from Cheyenne, Jefferson, Nemaha, Osage Phillips, Saline, Sedgwick, Sherman, Sumner, Wallace counties indicate no disease in other areas of the state.

The risk of severe disease in Kansas remains very low this year.

Erick De Wolf, Extension Plant Pathologist
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4. Canola Field Days scheduled for May 14 and 15

There will be canola field days and tours on May 14 and 15 in southern Kansas.

On May 14, the canola tours will be in Gray and Ford counties. The first stop is at 1:30 p.m. in Gray County. From the east side of Montezuma on US-56, take 13th Rd north 5 ¾ miles. Turn left (west) at the windmill and corrals and drive ¼ mile to the field.

The second stop is at 3 p.m. in Ford County. From Dodge City, take US-56 south of town. Just west of the US-400 Northwest Bypass intersection, turn north on 107th Rd and drive 1 ¼ miles. Take a right (east) onto Beeson Rd/Marshall Rd and drive over the US-400 Bypass. Take an immediate left (north) onto 107th Rd and drive ½ mile to the field.

On May 15, the canola field day is in Harper County. This field day features three stops. The first stop will be at 9 a.m. at the junction of NE 80th Ave. and U.S. Hwy 160 near Danville. Following this, the second stop is at the junction of NE 80th Ave. and NE 60th Rd. The tour ends with the third stop at the east edge of Harper on Hwy 160 at the air strip.

This field day will conclude with a lunch at the Blue Fair Barn in Harper, sponsored by the Anthony Farmers Coop and Danville Farmers Coop.

At both field days on May 14 and 15, speakers from K-State, Oklahoma State University, and the Great Plains Canola Association will be present to discuss this year's crop and answer questions.

To RSVP for lunch at the field day in Harper County, contact Anthony Farmers Coop, 620-842-5181; Danville Coop, 620-962-5238; or the Harper County Research and Extension office, 620-842-5445.

These field days are part of an ongoing effort to provide production and marketing information on canola production in Kansas and the Central Plains. Our goal is to help producers understand more about canola agronomy and marketing.

Mike Stamm, Canola Breeder
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5. South Central Experiment Field Spring Field Day, May 20

The Spring Field Day at the South Central Experiment Field will be held May 20, starting at 5:30 p.m. The event begins at the Redd Foundation field, located at 7904 South Highpoint Road (two miles west of Partridge on Trail West Road, then half mile south on Highpoint Road). The second half of the evening will be at the field headquarters, 10620 S. Dean Road.

The main topics will be wheat and winter canola. Among those speaking will be Alan Fritz, K-State wheat breeder at Manhattan, and Erick DeWolf, K-State Extension plant pathologist.

More information about the field day is available by calling Gary Cramer, agronomist-in-charge, at 620-662-9021. A meal will follow the field day.

6. Wheat Tour in Tribune, Spring Field Day in Garden City to be held May 27

Wheat Tour in Tribune, Spring Field Day in Garden City to be held May 27

The Southwest Research-Extension Center will host its Dryland Wheat Tour in Tribune and a Spring Field Day in Garden City both on the same date, May 27. The two programs are timed so that participants can attend both if they like.

The Dryland Wheat Tour begins at 8:15 a.m. MDT one mile west of Tribune on K-96 Hwy. Presentation topics by K-State Research and Extension specialists will include wheat varieties, diseases, and insects.

The Spring Field Day in Garden City starts with registration at 2:15 p.m. CDT. Presentation topics will include wheat varieties, diseases, and insects and canola varieties and production, as well as a presentation on cover crops.

A supper, sponsored by the U.S. Canola Association; Crop Production Services; Farm Credit of Southwest Kansas and Garden City Co-op Inc. will follow the field day in Garden City.

More information is available by contacting the Southwest Research-Extension Center at 620-276-8286.

7. Spring Crops Field Day planned May 29 in Parsons

The Southeast Agricultural Research Center will host its Spring Crops Field Day Thursday, May 29 at the Parsons Field on Thursday, May 29.

The field is just south of U.S. Highway 400 on Ness Road (North 32nd Street).

The day begins with registration and a sponsored, complimentary breakfast from 7:30 a.m.-8:30 a.m. A tour of 36 wheat varieties will follow breakfast, led by Doug Shoup, K-State southeast area Extension agronomist, Kelly Kusel, K-State research assistant, and seed company representatives.

Other presentations by K-State specialists include:

- Use of Cover Crops in Kansas – DeAnn Presley, soil management specialist;
- Corn and Soybean Weed Control Update – Curtis Thompson, weed scientist; and
- Wheat Response to Residual Nitrogen after Drought-Stressed Corn – Dan Sweeney, soil and water management agronomist.

In case of rain, the program will be held indoors.

8. Comparative Vegetation Condition Report: April 15 - 28

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=CRP3Y5NIggw
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 states.

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:

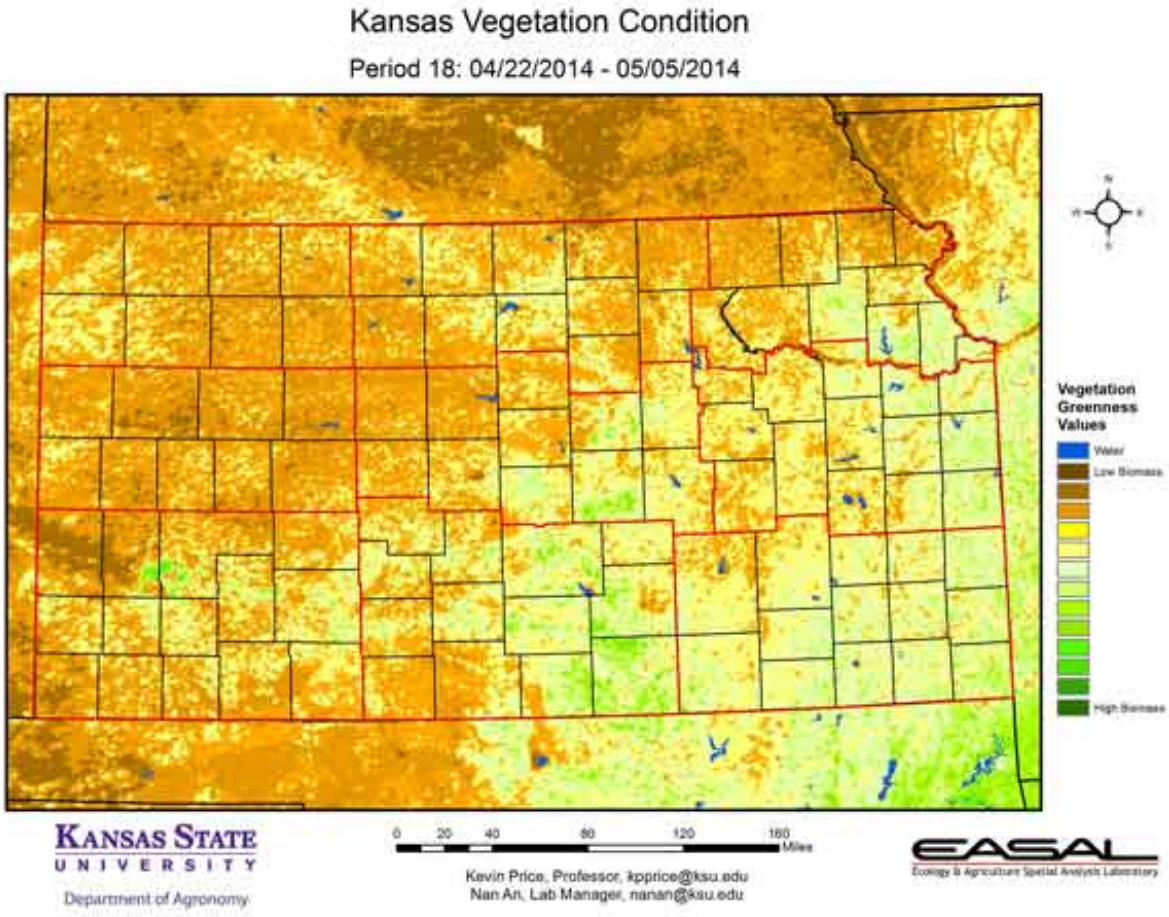

Figure 1. The Vegetation Condition Report for Kansas for April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that vegetative activity is limited. The greatest activity is confined to south central and central Kansas, where winter wheat is in active development. Much of the wheat in these areas is approaching or at the heading stage.

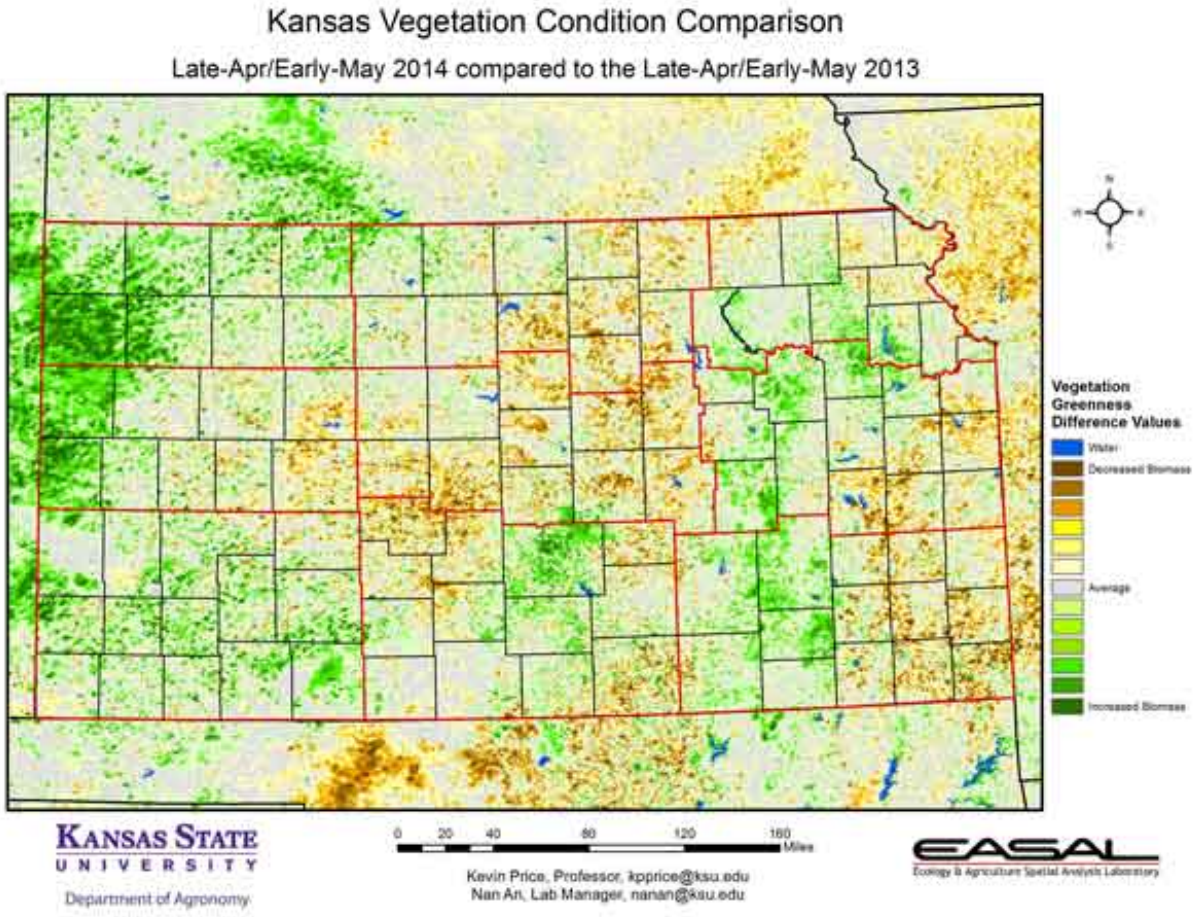

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that northwest Kansas has the greatest increase in vegetative activity. Much of this is the result of the September moisture, coupled with the extremely poor conditions that prevailed last year. It does not indicate particularly good conditions this year.

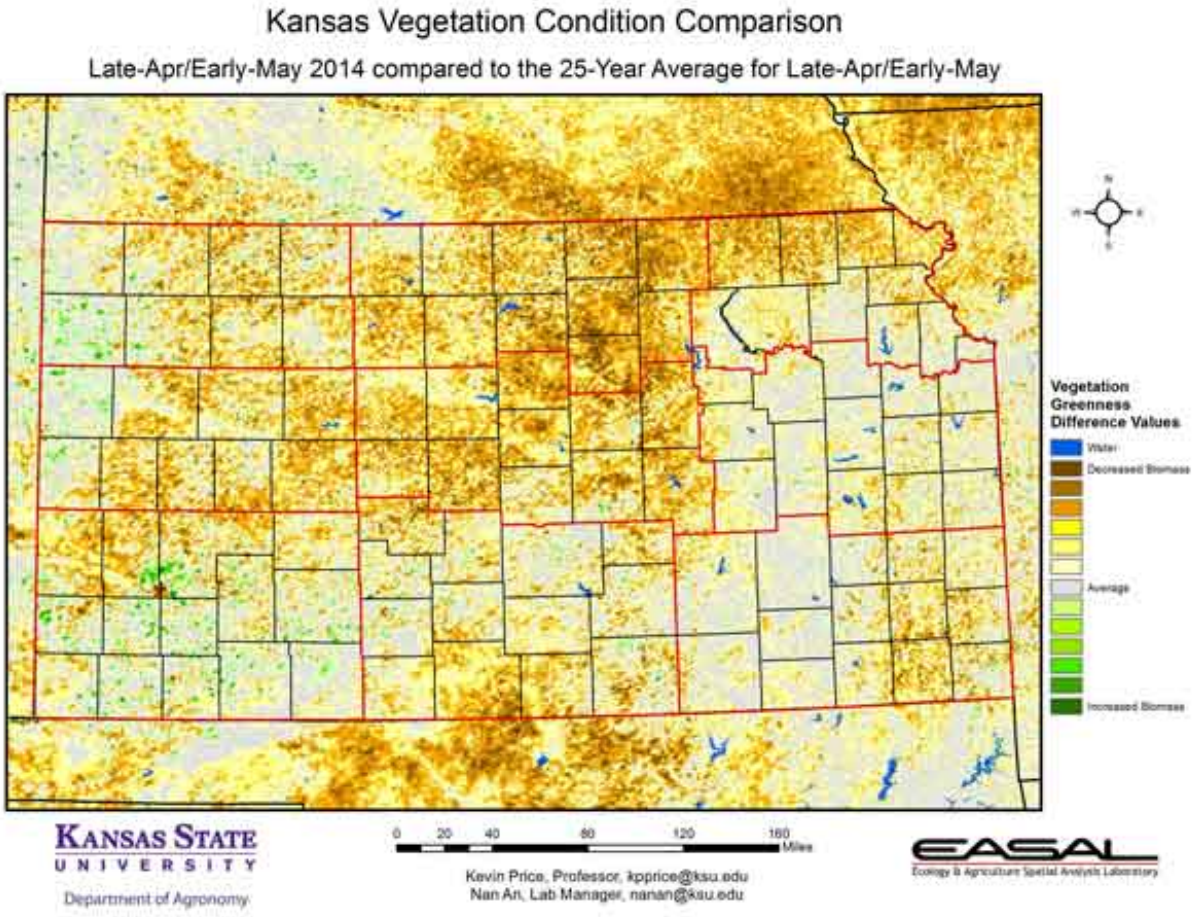

Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows much of the state has lower-than-normal vegetative activity. In central and north central Kansas, the cooler and drier conditions have resulted in much lower biomass production than usual.

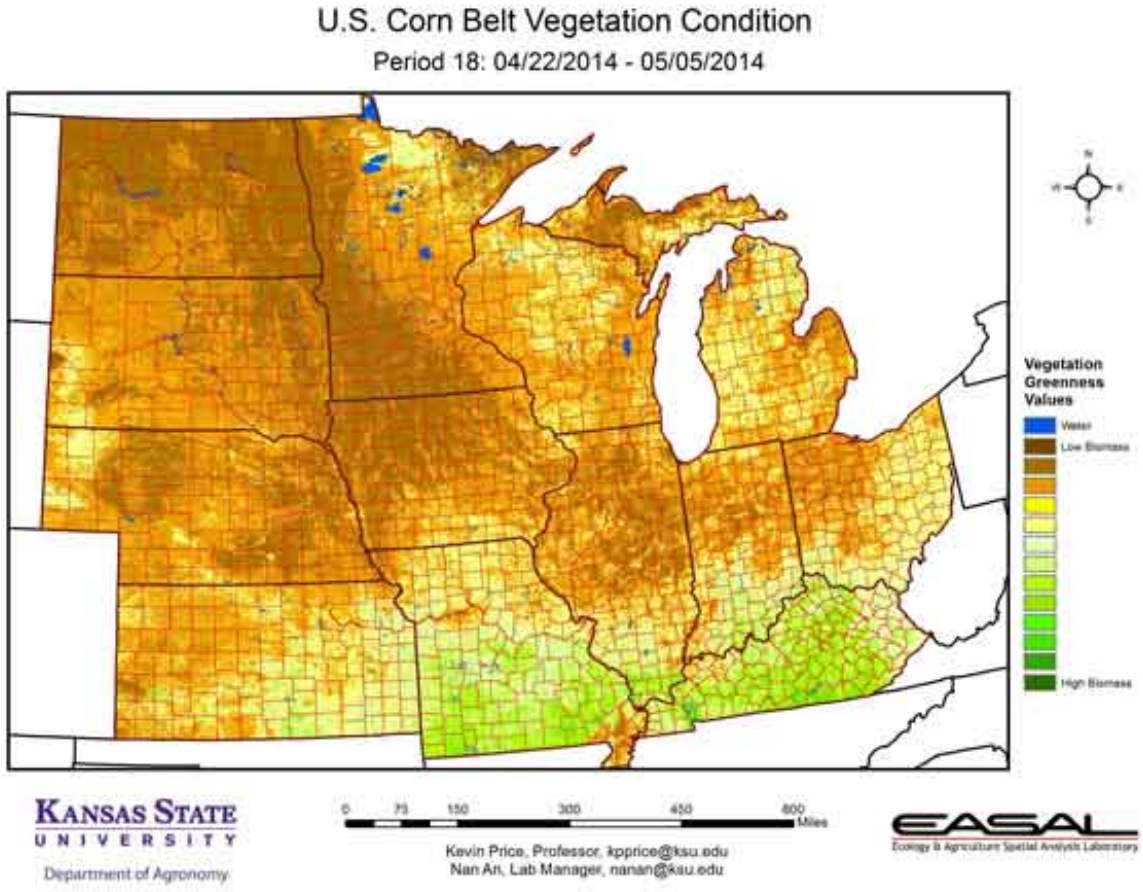

Figure 4. The Vegetation Condition Report for the Corn Belt for April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that photosynthetic activity is confined to the southern portions of the region. Continued cool weather has slowed development in the northern portions of the Corn Belt. In Iowa, both oat and corn planting was reported to be significantly behind average.

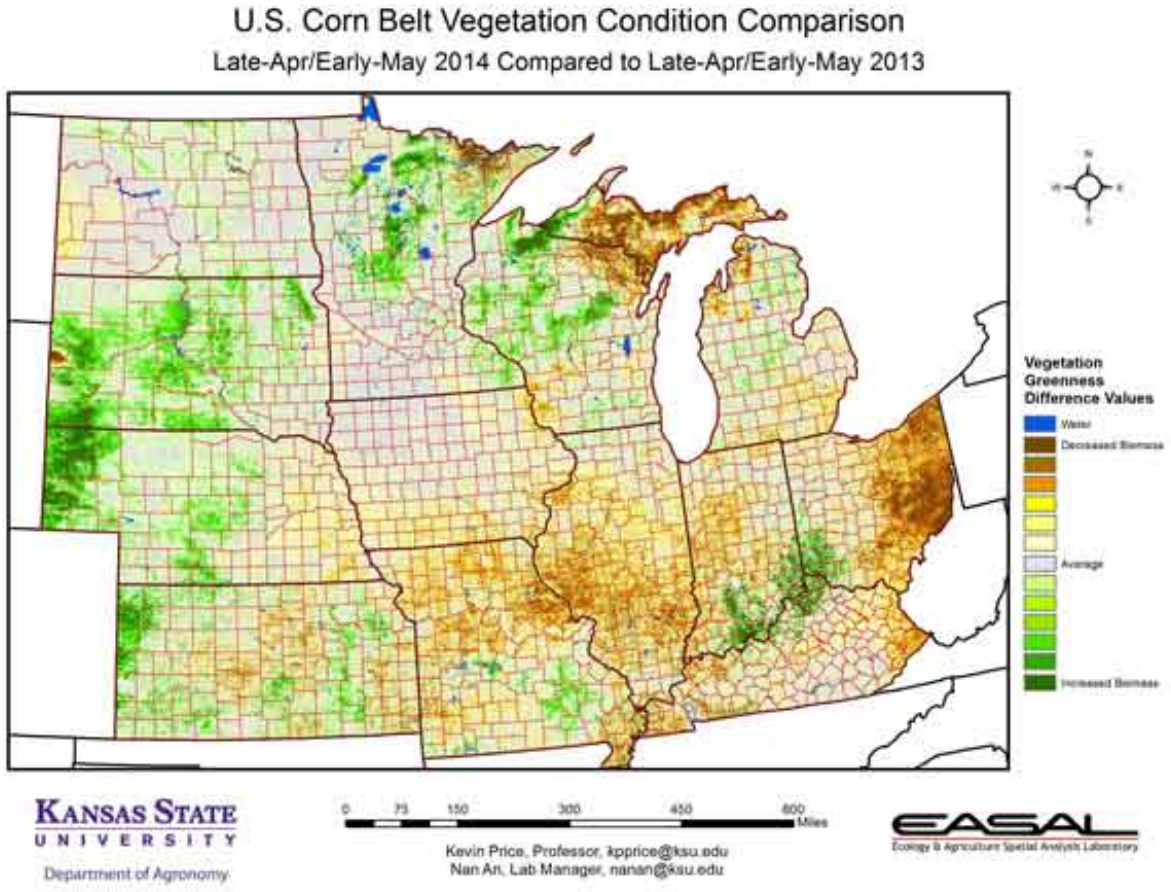

Figure 5. The comparison to last year in the Corn Belt for the period April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows South Dakota has the widest area of increased biomass productivity. Last year in South Dakota only 6 percent of the wheat was reported in good condition. This year the report has 62 percent of the wheat in good condition.

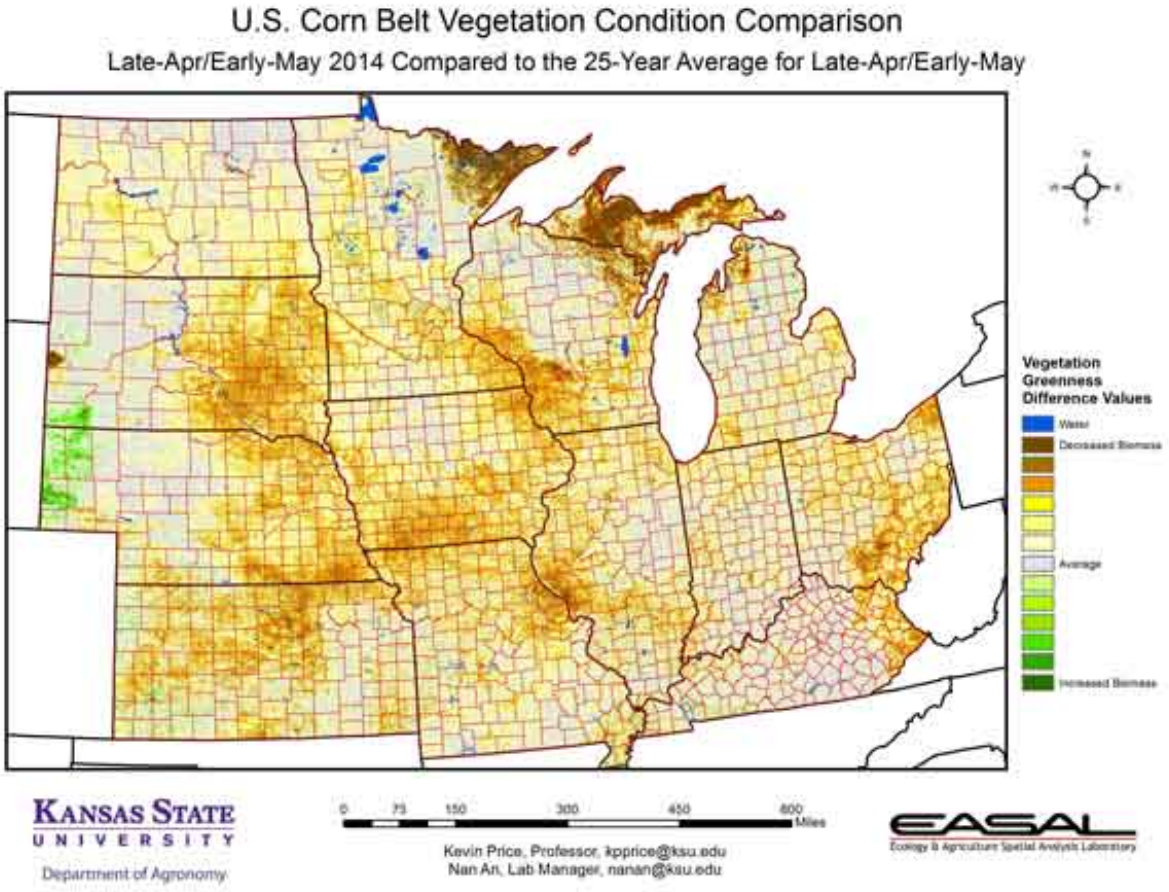

Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the most extreme area of below-average biomass productivity is in the northern Great Lakes region. Cool temperatures and lingering snow cover are the major deterrents to vegetative activity in these areas.

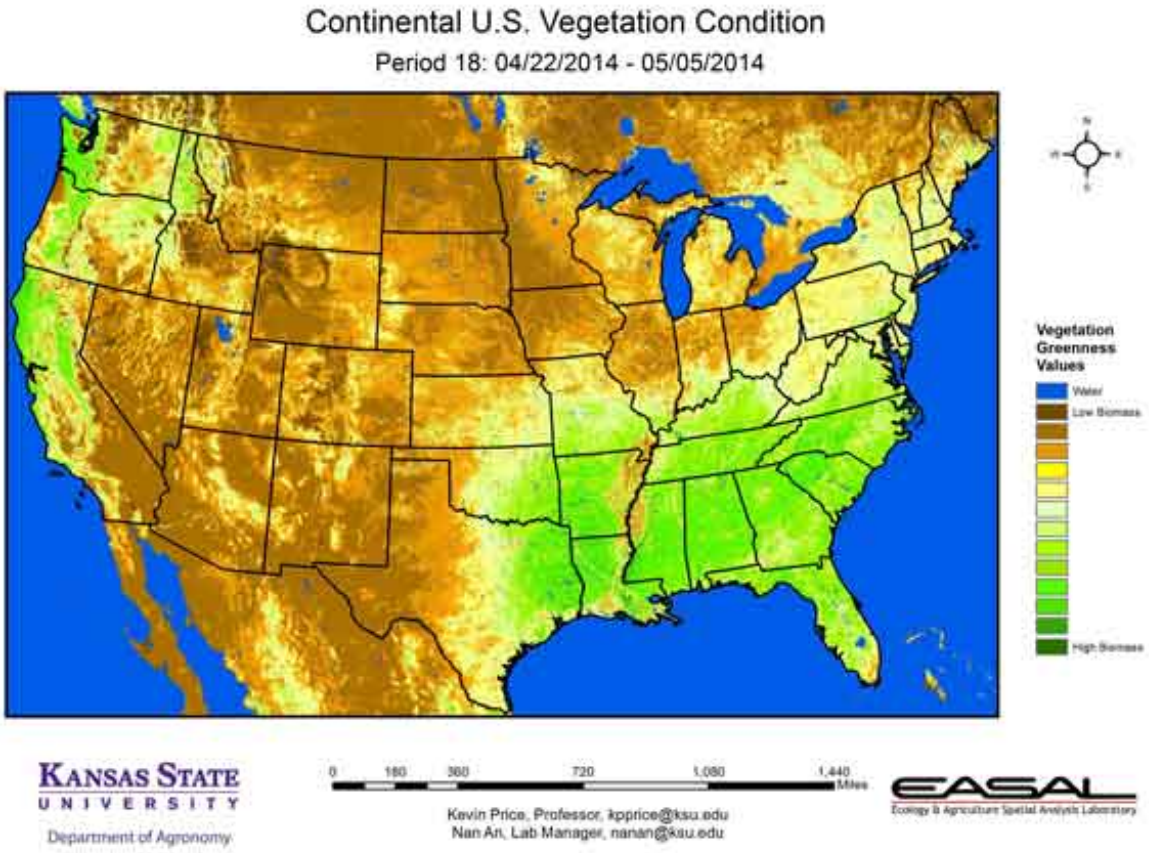

Figure 7. The Vegetation Condition Report for the U.S. for April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest level of vegetative activity is in the South and the Pacific Northwest. For the South, favorable to excessive moisture and mild temperatures have help biomass production. For the Pacific Northwest, shrinking snow packs have resulted in more vegetative activity, with increasing drought concerns.

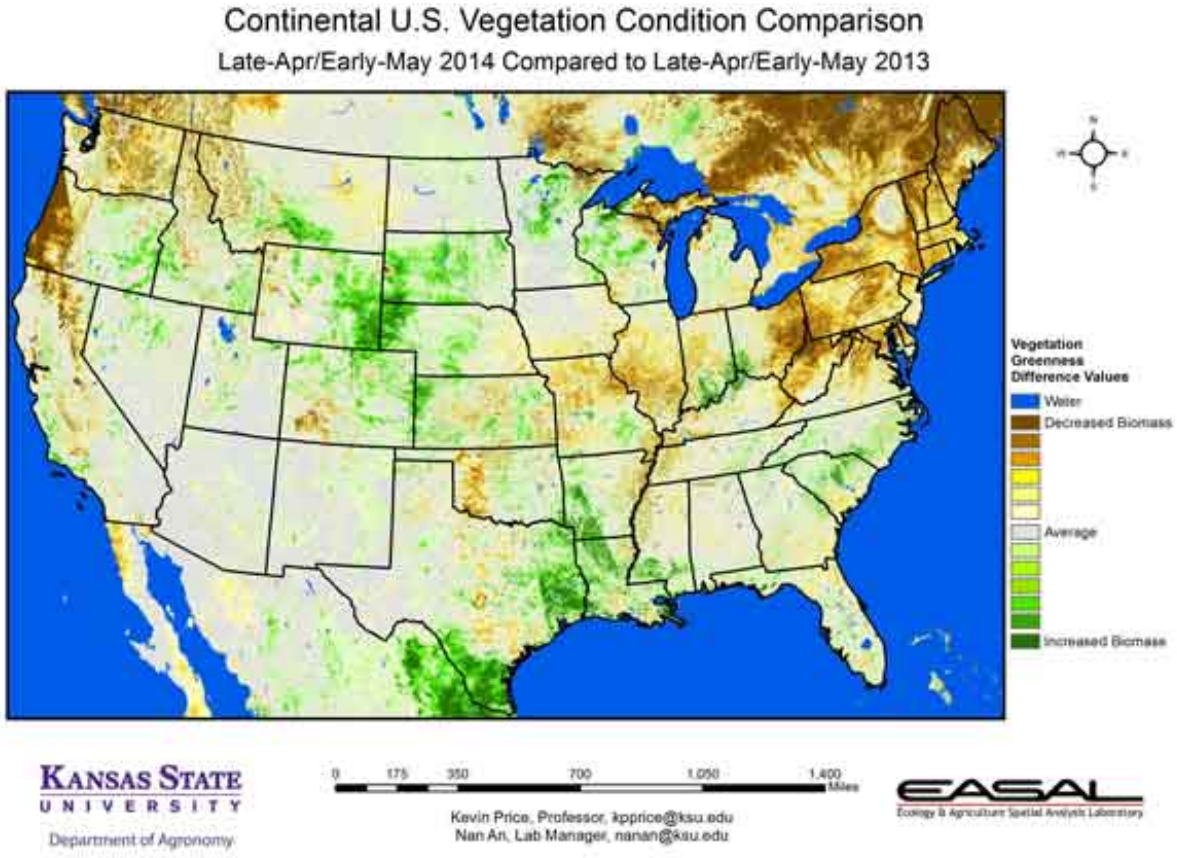

Figure 8. The U.S. comparison to last year at this time for the period April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that New England and the Pacific Northwest have lower biomass production than last year at this time. The greatest increase in productivity is in western Nebraska and eastern Wyoming. In these areas, snow cover is not as great as last year, and temperatures are slightly warmer.

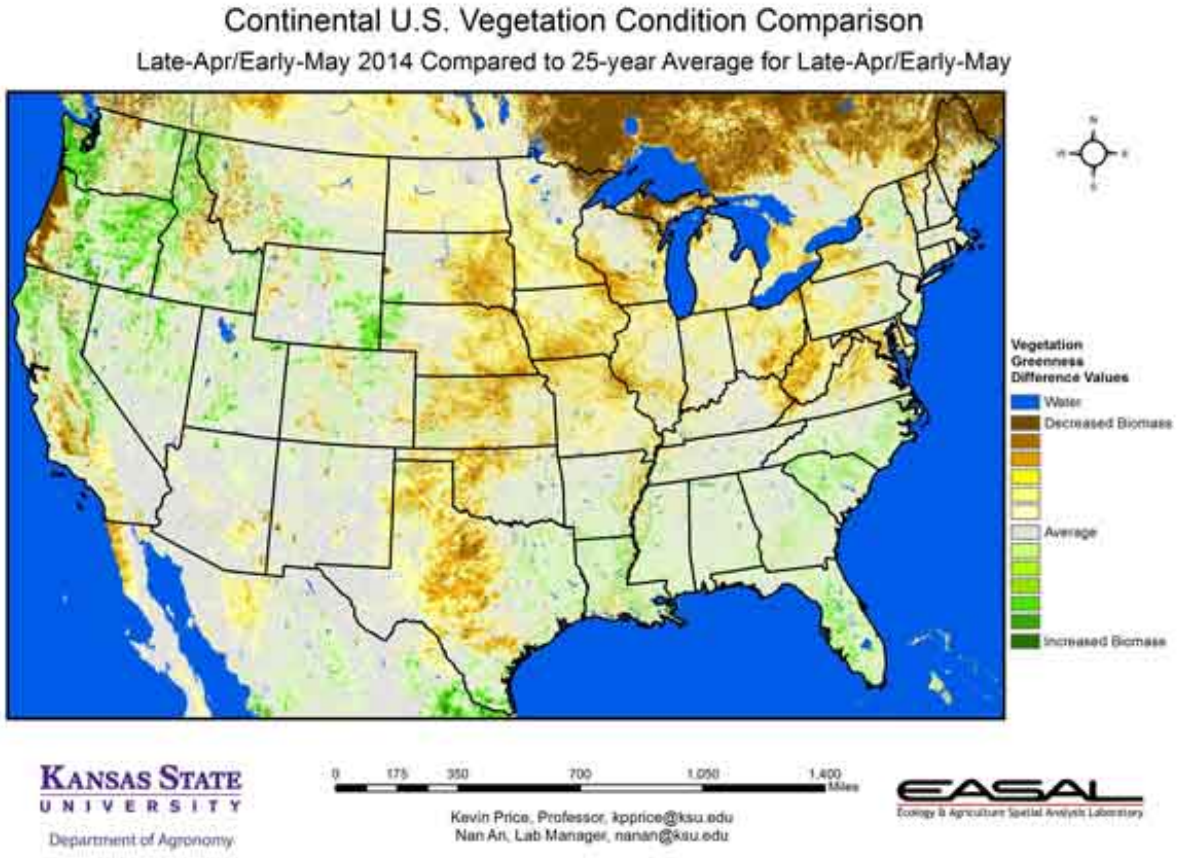

Figure 9. The U.S. comparison to the 25-year average for the period April 22 – May 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that below-average biomass production is most pronounced from the Central Plains to central Texas. On the north end of the region, cooler-than-average temperatures have delayed productivity; on the southern end of the region, drought is the major culprit in below-average activity.

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